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ABSTRACT

This instructor's manual for workplace trainers contains the materials required to conduct a course in basic workplace mathematics skills. The course consists of six lessons for workers and two lessons for supervisors that discuss the following: concepts taught in the six lessons; workers' progress in the individual lessons; and strategies for helping workers continue to develop the basic math skills taught in the course. The following materials are provided for each course: lesson plan, learning activities based on real-life situations, handouts, assessments (including pretests and posttests), and transparencies. Each lesson plan contains objectives, a list of materials needed, classroom setup information, and detailed instructions for conducting all activities. The following topics are covered: using estimation and rounding techniques; converting from the English system of measurement to the metric system; using fractions and decimals; calculating rates, ratios, proportions, and percentages; and using calculators. (MN)

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ED 426 310

# Math Basics:

# Building a Foundation

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Winning At Work

# Math Basics: Building a Foundation

- Estimating and Rounding
- The English and the Metric Systems
- Discovering Fractions
- Discovering Decimals
- Rates, Ratios, Proportions, and Percents
- Using the Calculator

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## ▼ An Introduction

Math Basics is an introduction to basic math skills that are frequently used in the workplace. Workers have the opportunity to use real life situations as they learn such skills as estimating and rounding, using fractions and decimals, and converting from English to Metric system. Math is a subject that many workers fear and misunderstand, yet in the workplace it is often critical to producing a high quality product.


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# ▼ Module 10 Materials

| Materials | Lesson# |
|---|---|
| Flip chart or whiteboard | All |
| Overhead projector | All |
| Transparency pens | All |
| Whiteboard markers | All |
| Name tags | 1 |
| Medium size glass container filled with jelly beans | 1 |
| Empty large size glass container (Twice as big as the medium size container) | 1 |
| Rulers (Metric and English) | 2 |
| Scales (Metric and English) | 2 |
| Metersticks | 2 |
| Yardsticks | 2 |
| Calculators | 2, 6 |
| Circular fraction tiles | 3 |




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Winning At Work

# Math Basics

## Building a Foundation

**Lesson 1**
**Estimating and Rounding**

## ▼ Lesson Description

After you welcome the employees, this lesson offers them an opportunity to share some information about themselves with the class. Then the lesson introduces employees to the concept of estimating and rounding numbers.


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## Objectives

By completing this lesson, employees will be able to:

1. **Understand** the meaning of *rounding* and *estimating numbers.*
2. **Estimate** answers using upper and lower bounds as guides.
3. **Round** numbers properly.

## Materials Needed

### Forms

"PreTest"

"Learner Enrollment"

## Materials (cont'd)

### Hardware

1. Flip chart or whiteboard
2. Overhead projector
3. Transparency markers
4. Whiteboard markers
5. Name tags
6. Medium-size glass container filled with jelly beans
7. Empty large-size glass container (twice as large as the medium-size container)

### Transparencies

"Getting to Know You" (Transparency 1)

"A Look at Today's Lesson" (Transparency 2)

"Estimating Practice" (Transparency 3)

"Basic Rounding Practice" (Transparency 4)

"Benefits of Rounding" (Transparency 5)

"More Estimating Practice" (Transparency 6)

## Materials (cont'd)

### Handouts

"Getting to Know You" (Handout 1)

"A Look at Today's Lesson" (Handout 2)

"Estimating Practice" (Handout 3)

"Basic Rounding Practice" (Handout 4)

"Example of Benefits of Rounding" (Handout 5)

"More Estimating Practice" (Handout 6)

"Lesson Follow-Up" (Handout 7)

## Classroom Set-up

### Total Time: 90 minutes

| | |
|---|---|
| Opening- Large Group | 20 min. |
| First Activity- Large Group | 25 min. |
| Second Activity- Large Group | 20 min. |
| Third Activity- Large Group | 15 min. |
| Fourth Activity- Large Group | 5 min. |
| Ending- Large Group | 5 min. |

**Key** — Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet


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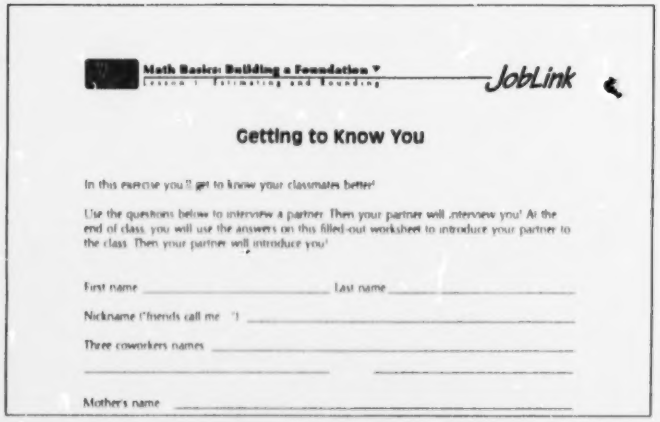

Math Basics: Building a Foundation ▼
Lesson 1: Estimating and Rounding
JobLink

Getting to Know You

In this exercise you'll get to know your classmates better!

Use the questions below to interview a partner. Then your partner will interview you! At the end of class, you will use the answers on this filled-out worksheet to introduce your partner to the class. Then your partner will introduce you!

First name _____ Last name _____

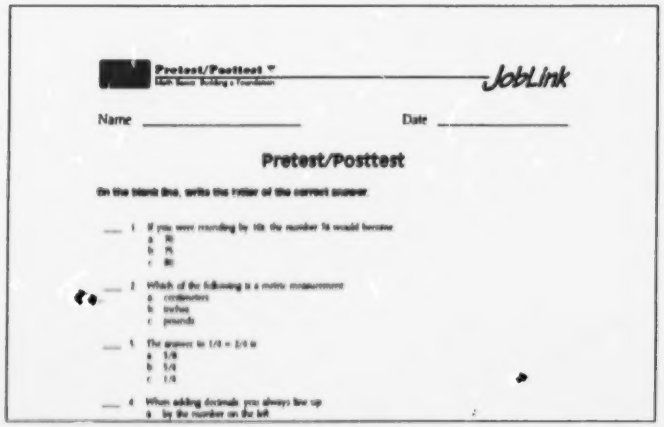
Nickname (Friends call me "): _____

Three coworkers names _____

_____ _____

Mothers name _____

Handout 1, Transparency 1


Pretest/Posttest ▼
Math Basics: Building a Foundation
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Name _____ Date _____

Pretest/Posttest

On the blank line, write the letter of the correct answer.

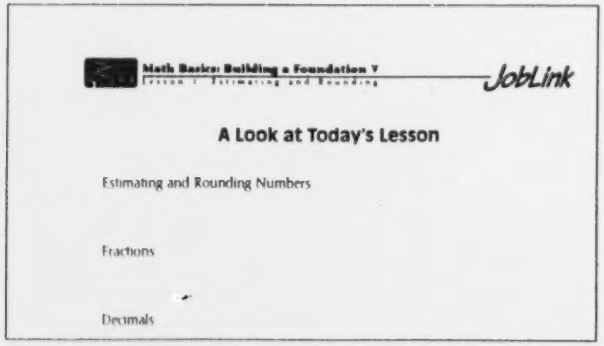
___ 1. If you were rounding by 10s the number 76 would become
a. 70
b. 75
c. 80

___ 2. Which of the following is a metric measurement
a. centimeters
b. inches
c. pounds

___ 3. The answer to 1/4 + 2/4 is
a. 1/8
b. 3/4
c. 1/4

___ 4. When adding decimals you always line up
a. by the number on the left

Form


Math Basics: Building a Foundation ▼
Lesson 1: Estimating and Rounding
JobLink

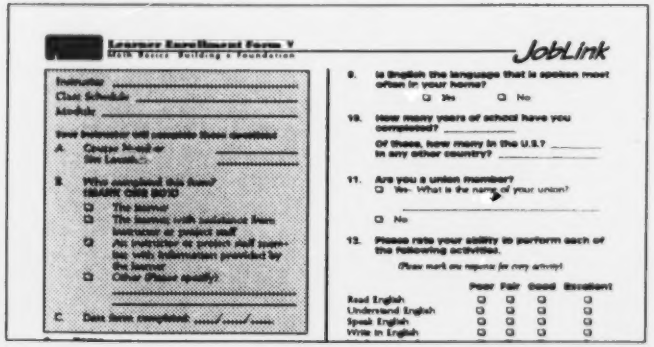
A Look at Today's Lesson

Estimating and Rounding Numbers

Fractions

Decimals

Handout 2, Transparency 2


Learner Enrollment Form ▼
Math Basics: Building a Foundation
JobLink

Instructor _____
Class Schedule _____
Module _____

Intake Interviewer will complete these questions

A. Choose level or lab Levels: _____

B. Who completed this form? (MARK ONE BOX)
☐ The learner
☐ The learner, with assistance from instructor or project staff
☐ An instructor or project staff member with information provided by the learner
☐ Other (Please specify) _____

C. Date form completed: ____/____/____

9. Is English the language that is spoken most often in your home?
☐ Yes ☐ No

10. How many years of school have you completed? _____
Of these, how many in the U.S.? _____
In any other country? _____

11. Are you a union member?
☐ Yes- What is the name of your union? _____
☐ No

12. Please rate your ability to perform each of the following activities.
(Please mark one response for every activity)

| | Poor | Fair | Good | Excellent |
|---|---|---|---|---|
| Read English | ☐ | ☐ | ☐ | ☐ |
| Understand English | ☐ | ☐ | ☐ | ☐ |
| Speak English | ☐ | ☐ | ☐ | ☐ |
| Write in English | ☐ | ☐ | ☐ | ☐ |

Form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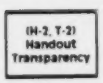
# ▼ Activities

## ▼ Opening: 25 Minutes

1. **Welcome** all employees. Introduce yourself. **Ask** them to sign in and to make name tags.

2. **Distribute** "Getting to Know You" and **project** it on the overhead. **Ask** employees to walk around the room to try to find other people who can sign their names in the appropriate boxes. **Tell** them that each person may sign her or his name in only one box per sheet and that they may may not be able to fill all boxes. **Ask** employees to share the names of the people in each box when the activity is completed.

3. **Ask** employees to introduce themselves and to include in their introductions one thing that they are good at.




4. **Tell** them the goal for the next several weeks: *to enhance their math skills.* **Distribute** and **project** "A Look at Today's Lesson" on the overhead to introduce the topics that will be covered in the math lessons. **Tell** them that you will ask for their input at the end of each lesson and that you will use their input to adjust future lessons to meet their needs.

4. Have the students fill out "Learner Enrollment" form.

5. **Handout** "Pretest". **Explain** that they should do their best. **Explain** that you **do not** expect them to know the answers, and they will take this test again at the end of the module.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# ▼ Activities

## ▼ First Activity: 25 Minutes

1. **Pass** around the jar of jelly beans. **Ask** the employees to write down how many jelly beans are in the container. **Write** their responses on the board.

2. **Explain** that they just *estimated* an answer. **Ask,** "How did you make your guesses?" **Write** all responses on the board, and **discuss** the responses briefly.

3. **Explain** that there are ways of knowing whether an estimate is good. For example, tell the class, "I believe there are ten jelly beans in the container." **Ask** them what they think of your guess. Now tell them, "Actually, I think there are *one million* jelly beans." Again, **ask** them what they think of your guess. (Obviously, they should indicate that your guesses are not good estimates.)

4. **Ask** employees, "What are the chances that your estimate will be exactly correct?" Then **ask,** "Why or why not?" After the discussion, **reveal** the true number of jelly beans in the container.

5. **Explain** that estimating numbers is a skill that is used every day. **Say,** "For example, if you are asked to make a dozen tables, you will need to estimate the time that it will take to complete the job."


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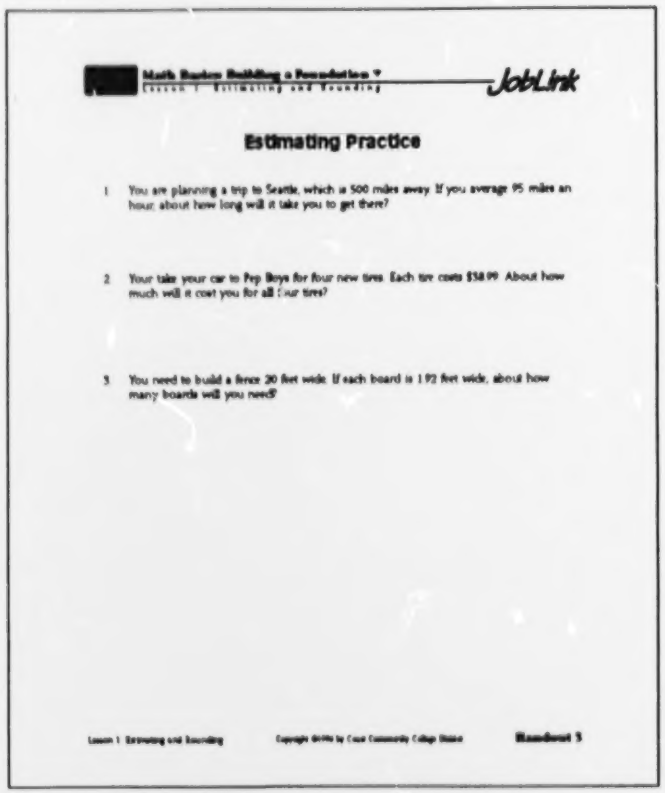

Math Basics: Building a Foundation ▼
Lesson 1: Estimating and Rounding
JobLink

**Estimating Practice**

1. You are planning a trip to Seattle, which is 500 miles away. If you average 95 miles an hour, about how long will it take you to get there?

2. Your take your car to Pep Boys for four new tires. Each tire costs $58.99. About how much will it cost you for all four tires?

3. You need to build a fence 20 feet wide. If each board is 1.92 feet wide, about how many boards will you need?

Lesson 1: Estimating and Rounding  Copyright ©1996 by Coast Community College District  Handout 3

**Handout 3, Transparency 3**


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# ▼ Activities

## ▼ First Activity (continued)

6. **Ask** the employees, "When do you need to estimate?" **Cluster** all answers on the board.

7. **Explain** that they will be learning ways to improve the accuracy of their estimates. **Say,** for example, "Usually you will have more information that you can draw on to develop a more-accurate estimate."

8. **Hold** up the jar of jelly beans and then the empty jar, which is twice as large. Holding the larger jar, **ask,** "How many jelly beans will fill *this* jar?" Then **ask,** "What information do you already have that can help you answer?" **Elicit** employees' responses.

9. **Distribute** and **project** "Estimating Practice". **Say,** "When we are working with numbers, we sometimes need only an estimate, not an exact value." Allow employees time to work on the worksheet.


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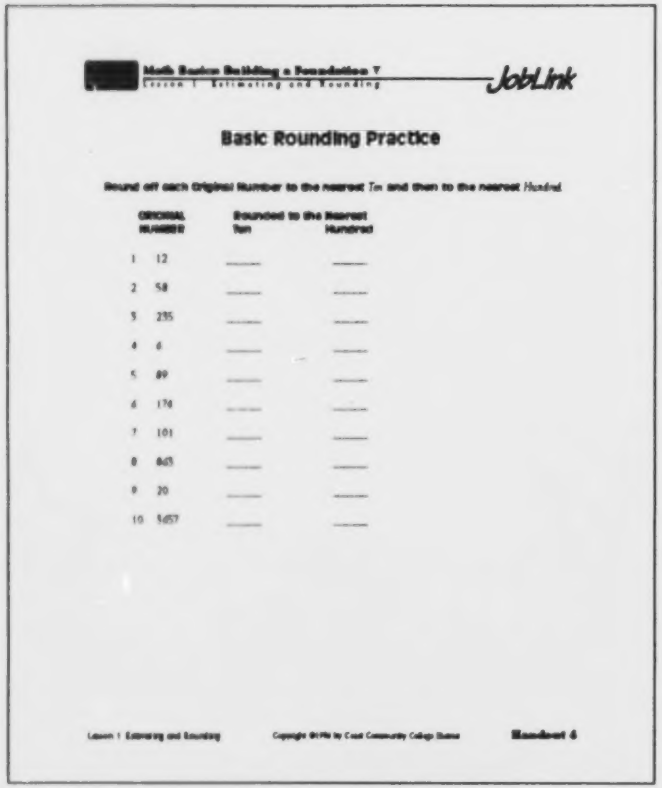

Math Basics: Building a Foundation ▼ JobLink
Lesson 1: Estimating and Rounding

**Basic Rounding Practice**

Round off each Original Number to the nearest *Ten* and then to the nearest *Hundred*.

| | ORIGINAL NUMBER | Rounded to the Nearest Ten | Rounded to the Nearest Hundred |
|---|---|---|---|
| 1 | 12 | _____ | _____ |
| 2 | 58 | _____ | _____ |
| 3 | 235 | _____ | _____ |
| 4 | 6 | _____ | _____ |
| 5 | 89 | _____ | _____ |
| 6 | 176 | _____ | _____ |
| 7 | 101 | _____ | _____ |
| 8 | 845 | _____ | _____ |
| 9 | 20 | _____ | _____ |
| 10 | 5457 | _____ | _____ |

Lesson 1: Estimating and Rounding Copyright ©1996 by Coast Community College District Handout 4

Handout 4, Transparency 4

Math Basics: Building a Foundation ▼ JobLink
Lesson 1: Estimating and Rounding

**Benefits of Rounding**

John goes to the store. He wants to buy 8 packages of nails for $1.97 each. He has $17. Does he have enough money to buy the nails?

Lesson 1: Estimating and Rounding Copyright ©1996 by Coast Community College District Handout 5

Handout 5, Transparency 5


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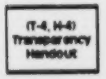
# ▼ Activities

## ▼ Second Activity: 20 Minutes

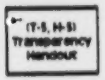
1. **Introduce** *rounding*. Say, "A very helpful estimating process is called *rounding*. Rounding lets you end any number in a zero, and numbers that end in zero are easier to work with. You can round numbers in several ways, as you will see next."

2. **Demonstrate** rounding by tens, by hundreds, and by thousands. To begin, **write** 76 on the board. **Say,** "If you are rounding by tens, you change 76 to 80. The reason is that 76 is closer to 80 than it is to 70." **Draw** ten short vertical hash marks on the board. **Label** the leftmost hash mark 70 and the rightmost 80. **Use** the marks to demonstrate that 76 is closer to 80 than it is to 80.

3. **Say,** "When a number is exactly in the middle, such as 75, you always *round up*. If you were rounding *by hundreds*, then you'd round 76 to 100. However, if you had 49 and were rounding by hundreds, your answer would be zero."




4. **Distribute** and **project** "Basic Rounding Practice". **Correct** the worksheet together.




5. **Distribute** and **project** "Benefits of Rounding" on the overhead **Allow** employees time to solve the problem. If they have difficulty, **explain** the solution step by step. **Say,** "First, round $1.97 to $2.00. Thus 8 packages times $2 equals $16. Because the cost ($16) is less than the amount of money that John has in his pocket ($17), he does have enough money to buy the nails."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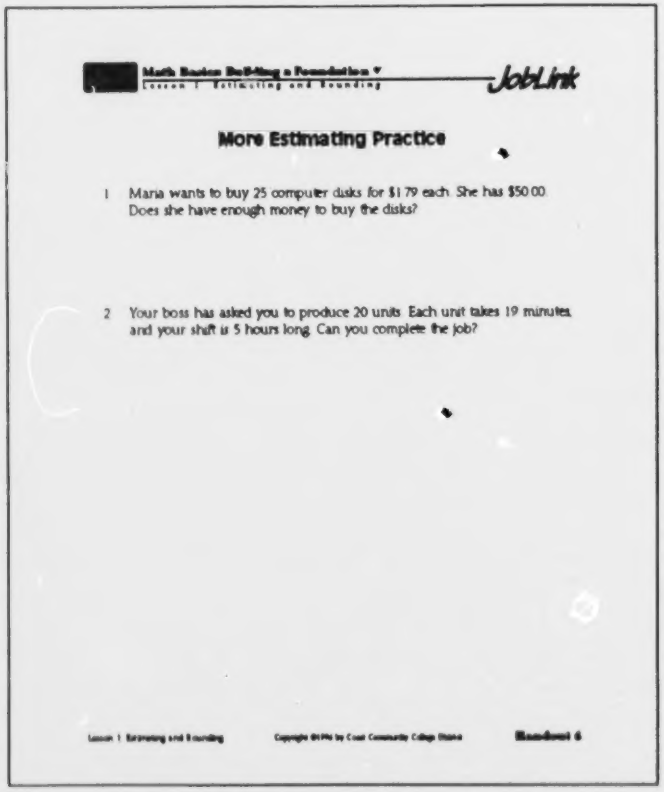

Math Basics: Building a Foundation ▼ JobLink
Lesson 1: Estimating and Rounding

**More Estimating Practice**

1. Maria wants to buy 25 computer disks for $1.79 each. She has $50.00. Does she have enough money to buy the disks?

2. Your boss has asked you to produce 20 units. Each unit takes 19 minutes, and your shift is 5 hours long. Can you complete the job?

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**Handout 6, Transparency 6**


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## ▼ Activities

### ▼ Third Activity: 15 Minutes

1. **Distribute** "More Estimating Practice" and **project** it on the overhead.

2. **Say,** "Here are additional examples for you to work on." Allow employees to work with a partner if they choose to. **Ask** employees to share how they calculated their answers. Then compare their estimates with the actual values.


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# ▼ Activities

## ▼ Fourth Activity: 5 Minutes

1. **Explain** *upper and lower bounds.* Then **say,** "It is important to look at upper and lower bounds for an estimate because they can give us a better idea of what the answer will be."

2. **Write** on the board the problem 39 times 11. **Say,** "Let's look at this problem. Without using a calculator or pencil and paper, what do you think the answer is?" **Point out** that 39 is close to 40 and that 11 is close to 10. Then **say,** "To estimate the answer for 39 times 11, we can more easily calculate the answer to 40 times 10–which is 400. Therefore, 400 is a good estimate."

3. If time allows, **write** similar examples on the board and **allow** employees time to estimate the answers.


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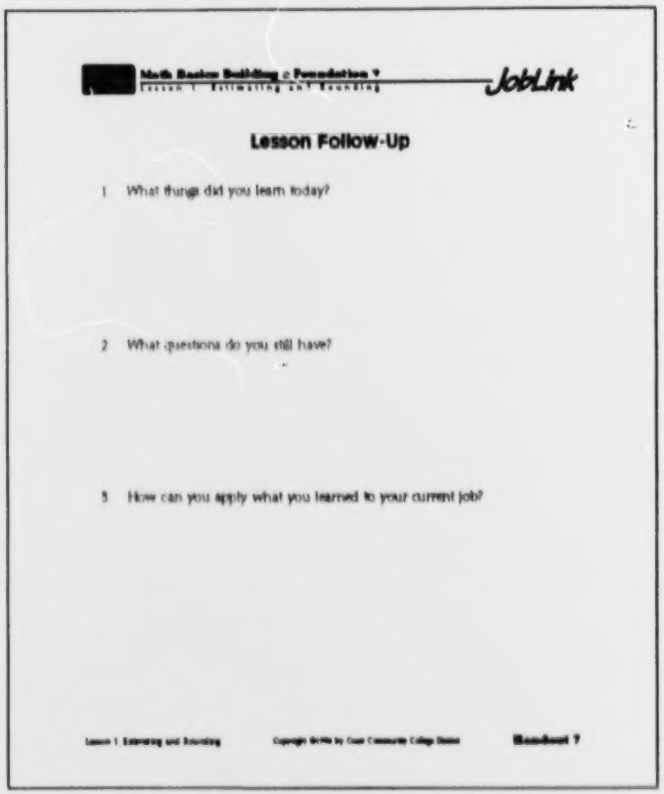

Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?

Handout 7


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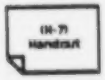
## ▼ Activities

### ▼ Ending: 5 Minutes

1. **Distribute** "Lesson Follow-Up" to employees and **ask** them to fill it out.



2. **Answer** any questions that employees may have, and then **say** goodbye.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Winning At Work

# Basic Math

## Building a Foundation

**Lesson 2**
**The English and the Metric Systems**



41

## ▼ Lesson Description

This lesson introduces the *English system* and the *metric system* of measurement. It shows how each system is used in real life situations, and it names some of the advantages and disadvantages of each system. In addition, employees will learn to convert from one system to another.


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## ▼ Objectives

By completing this lesson, employees will be able to:

1. **Distinguish** between the English system and the metric system.
2. **Convert** numbers from one system to the other.
3. **Explain** the meanings of "how long," "how much," "how large," and "how heavy."

## ▼ Materials Needed

### ▼ Hardware

1. Flip chart or whiteboard
2. Overhead projector
3. Transparency markers
4. Whiteboard markers
5. Rulers (Metric and English)
6. Scales (Metric and English)
7. Metersticks
8. Yardsticks
9. Calculators

### ▼ Transparencies

"Sample Cluster" (Transparency 7)
"Basic Measuring Practice" (Transparency 8)
"Prefix Chart" (Transparency 9)
"Conversion Chart" (Transparency 10)
"Conversion Problems" (Transparency 11)

## ▼ Materials (cont'd)

### ▼ Handouts

"Basic Measuring Practice" (Handout 8)
"Conversion Chart" (Handout 9)
"Conversion Problems" (Handout 10)
"Lesson Follow-Up" (Handout 11)

## ▼ Classroom Set-up

### ▼ Total Time: 90 minutes

| | |
|---|---|
| Opening- Large Group | 20 min. |
| First Activity- Large Group | 25 min. |
| Second Activity- Large Group | 20 min. |
| Third Activity- Large Group | 15 min. |
| Fourth Activity- Large Group | 5 min. |
| Ending- Large Group | 5 min. |

▼ **Key** Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet


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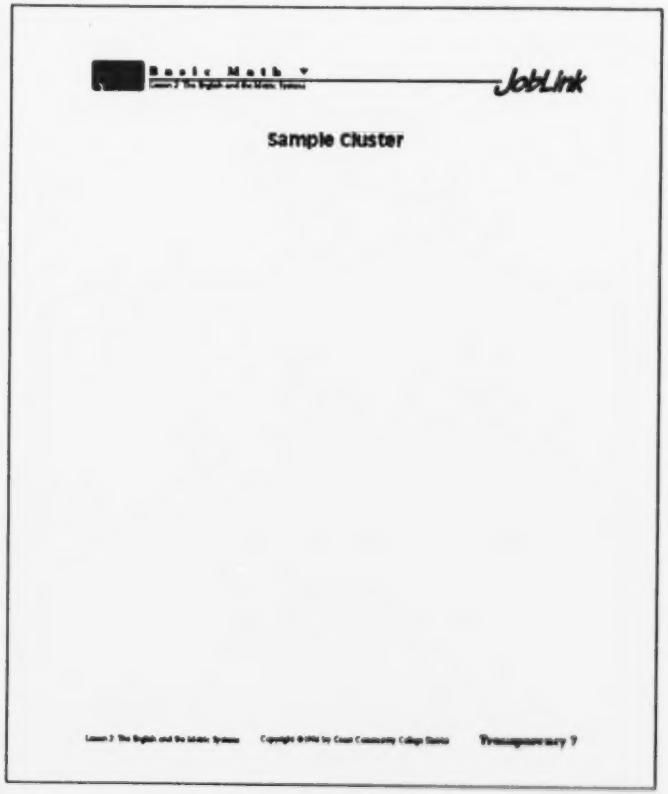


**Transparency 7**


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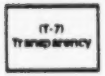
# ▼ Activities

## ▼ Opening: 20 Minutes

1. **Introduce** the topic of today's lesson: *measurement*. **Ask** the employees to explain the meanings of "how long," "how heavy," "how much," and "how large." **Write** all responses on the board.

2. **Explain** that all these words signify a type of *measurement*. **Say,** "We measure things every day. Understanding the words that are associated with measuring is therefore very important."



3. **Project** "Sample Cluster" and **demonstrate** on the board how to do a cluster.

4. **Ask** the employees for examples of situations that require measurement. **Say,** "Separate the situations into these three categories: *At Work, At Home,* and *Anywhere Else*. Then share your ideas with each one another."

5. **Write** a cluster on the board and **ask** the employees to provide the answers for all the spaces. Cluster as many responses as possible.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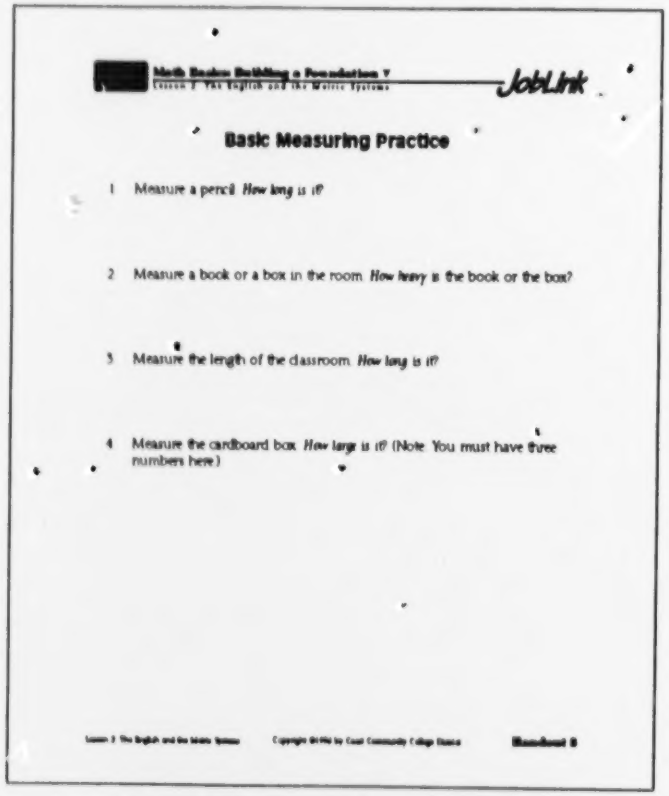

Basic Measuring Practice

1. Measure a pencil. *How long* is it?

2. Measure a book or a box in the room. *How heavy* is the book or the box?

3. Measure the length of the classroom. *How long* is it?

4. Measure the cardboard box. *How large* is it? (Note: You must have three numbers here.)

**Handout 8, Transparency 8**


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# ▼ Activities

## ▼ First Activity: 20 Minutes

1. **Say,** "Two measurement systems are used in the United States. One is called the *English system,* and the other is the *metric system.* Let's start by looking at the English system."

2. **Write** these five category headings on the board:

   **How Much** **How Long** **How Heavy** **How Fast** **How Large**

   **Ask** employees for examples of *units* in the English system that fall into each category and **write** their answers in the appropriate columns; for example, in the How Much column, write *gallon, quart, pint,* etc.

3. **Display** some measuring tools (e.g., rulers and scales) and **say,** "These are some of the tools we use to measure things. There are many others."

4. **Distribute** "Basic Measuring Practice" and **project** it on the overhead. **Say,** "Let's practice using these tools. We will be measuring in English units." Distribute rulers and scales that measure only in English units.

   **Note:** If anyone is not familiar with a scale or cannot read in 1/4- and in 1/2-inch increments, teach measuring basics before proceeding.

5. **Discuss** each completed measurement. **Emphasize** the *units* that each person used, for example, *inches, feet,* or *yards* for "how long."


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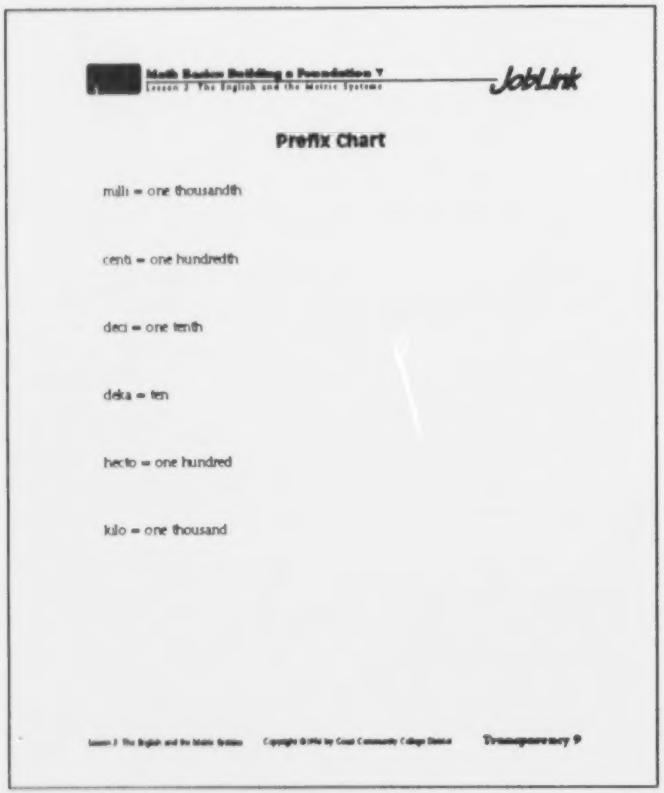


**Transparency 9**


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# ▼ Activities

## ▼ Second Activity: 20 Minutes

1. **Say,** "Now we will be looking at another system of measuring–the *metric system*. The metric system is used worldwide because of its simplicity. It is simple because it is based on counting by *tens*. Let's look at our categories of measuring."

2. **Erase** the English system units but **leave** the same five column headings on the board. Now **ask** employees to name *units in the metric system* and **write** their responses in the appropriate columns; for example, in the How Long column, write *kilometers, meters, centimeters,* etc.

3. **Explain** the system of adding prefixes to metric units:

   a. **Say,** "In the metric system, you add prefixes–word *beginnings*–to base words such as *meter, liter,* and *gram*. These prefixes change the base unit; they make the base units larger or smaller."

   b. **Project** "Prefix Chart" on the overhead and **discuss** the six prefixes listed.

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## ▼ Activities

### ▼ Second Activity: (continued)

c. **Explain** the word *centimeter*, for example, as follows: "*Centimeter* means *1 one-hundredth* of a meter. In other words, there are 100 centimeters in 1 meter. Similarly, there are 1000 millimeters in 1 meter. And there are 1000 meters in 1 kilometer." Go over this explanation slowly, and repeat it for *liters* and *grams*, emphasizing the consistency of the system.

d. **Write** on the board the abbreviations for standard metric terms, for example, *cm* for *centimeter*, and *km* for *kilometer*.

4. **Ask** employees to re-measure the items they measured earlier–but this time using the appropriate *metric* tools.


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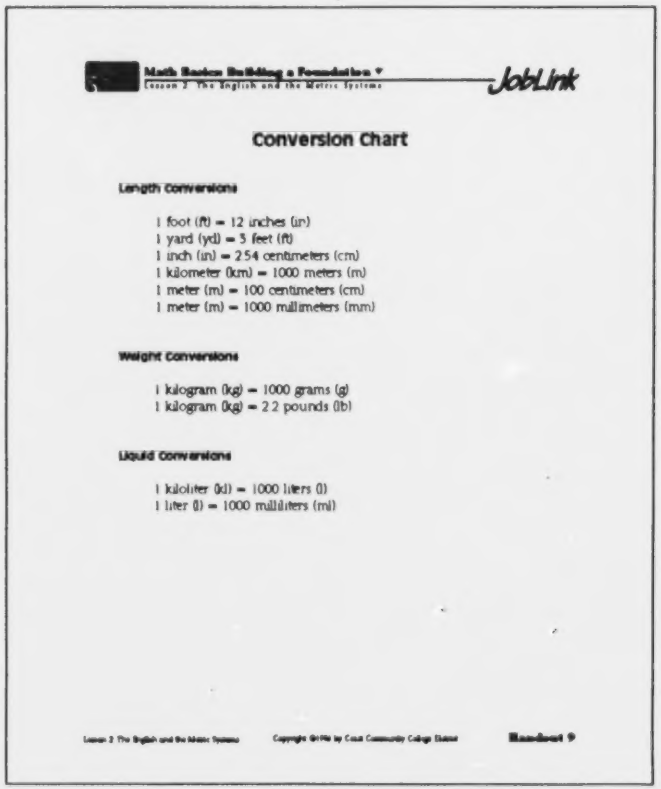

Math Basics: Building a Foundation ▼
Lesson 2: The English and the Metric Systems
JobLink

**Conversion Chart**

**Length Conversions**

1 foot (ft) = 12 inches (in)
1 yard (yd) = 3 feet (ft)
1 inch (in) = 2.54 centimeters (cm)
1 kilometer (km) = 1000 meters (m)
1 meter (m) = 100 centimeters (cm)
1 meter (m) = 1000 millimeters (mm)

**Weight Conversions**

1 kilogram (kg) = 1000 grams (g)
1 kilogram (kg) = 2.2 pounds (lb)

**Liquid Conversions**

1 kiloliter (kl) = 1000 liters (l)
1 liter (l) = 1000 milliliters (ml)

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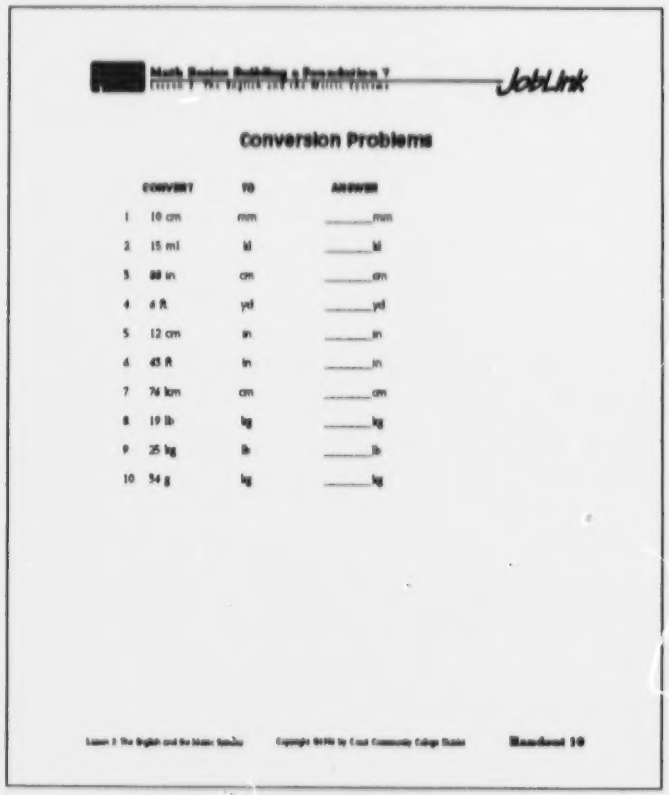
**Handout 9, Transparency 10**



Math Basics: Building a Foundation ▼
Lesson 2: The English and the Metric Systems
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**Conversion Problems**

| | CONVERT | TO | ANSWER |
|---|---|---|---|
| 1 | 10 cm | mm | _____mm |
| 2 | 15 ml | l | _____l |
| 3 | 88 in | cm | _____cm |
| 4 | 6 ft | yd | _____yd |
| 5 | 12 cm | in | _____in |
| 6 | 45 ft | in | _____in |
| 7 | 76 km | cm | _____cm |
| 8 | 19 lb | kg | _____kg |
| 9 | 25 kg | lb | _____lb |
| 10 | 54 g | kg | _____kg |

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**Handout 10, Transparency 11**


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G1
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G2

# ▼ Activities

## ▼ Third Activity: 20 Minutes

1. **Say,** "Sometimes you need to *convert* a measurement from one system to the other–or you may need to convert a measurement *within* a system, that is, convert from one unit to another." **Offer** these two examples:

   a. "Assume that you have only *English* system measuring tools and you need to express the measurement in *metric* units. How can you do so without metric tools available? The answer is simple: You *convert* the measurement from one system to the other."

   b. "Assume that you have a measurement, say, in *centi*meters and you need to express it in *milli*meters. How can you do so? Answer: By *converting* centimeters to millimeters."

2. **Distribute** "Conversion Chart" and **project** it on the overhead. **Discuss** the conversions with the employees. **Make sure** they understand all of the conversions.

3. **Demonstrate** on the board a specific conversion problem. **Say,** for example, "Assume that you measure a stick and that it's 10 inches long. Now you need to express that measurement in *centimeters*. For your conversion, you would use *1 inch = 2.54 cm*. Thus 10 inches equals 10 times 2.54, or 25.4 cm."

4. **Distribute** "Conversion Problems" to all employees and **project** it on the overhead.



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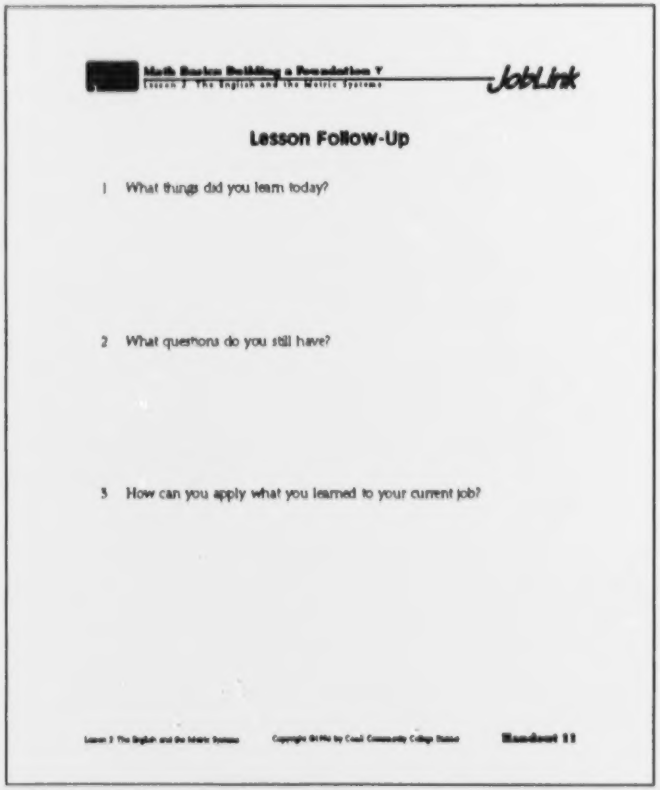

Math Basics: Building a Foundation ▼
Lesson 2: The English and the Metric Systems
JobLink

**Lesson Follow-Up**

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?

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**Handout 11**



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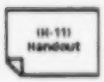
# ▼ Activities

## ▼ Ending: 5 Minutes

1. **Ask,** "What are the advantages and disadvantages of each system? When might you find it better to use one system versus the other?" **Elicit** employees' answers and **discuss**.




2. **Distribute** "Lesson Follow-Up" to all employees, and if time permits **ask** them to fill out the sheet.

3. **Answer** any questions employees have, and then **say** goodbye.

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Winning At Work

# Math Basics

## Building a Foundation

**Lesson 3**
**Discovering Fractions**

## ▼ Lesson Description

This lesson introduces *fractions*. First, it explains the meaning and the common functions of fractions, and then it provides the activities to help employees understand decimal fractions, which are most commonly used in workplace calculations. To master fractions, employees will use discovery learning techniques and will have ample practice adding, subtracting, multiplying, and dividing fractions.


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## ▼ Objectives

By completing this lesson, employees will be able to:

1. **Identify** a fractional value.
2. **Write** the fractional notation for a given shape.
3. **Add** and **subtract** fractions with like denominators and unlike denominators.
4. **Multiply** and **divide** fractions.

## ▼ Materials Needed

### ▼ Hardware

1. Circular fraction tiles
2. Overhead projector
3. Whiteboard or flip chart
4. Whiteboard markers
5. Transparency markers

## ▼ Materials (cont'd)

### ▼ Transparencies

"Introduction: Fraction Questions" (Transparency 12)

"Shaded Shapes" (Transparency 13)

"Fraction Bingo Board" (Transparency 14)

"Adding and Subtracting Fractions With Like Denominators" (Transparency 15)

"Fractions Comparison" (Transparency 16)

"Adding and Subtracting Fractions With Unlike Denominators" (Transparency17)

"Multiplying and Dividing Fractions" (Transparency 18)

"Lesson Follow-Up" (Transparency 19)

### ▼ Handouts

"Introduction: Fraction Questions" (Handout 12)

"Shaded Shapes" (Handout 13)

"Fraction Bingo Board" (Handout 14)

## ▼ Materials (cont'd)

"Adding and Subtracting Fractions With Like Denominators" (Handout 15)

"Fractions Comparison" (Handout 16)

"Adding and Subtracting Fractions With Unlike Denominators" (Handout 17)

"Multiplying and Dividing Fractions" (Handout 18)

"Lesson Follow-Up" (Handout 19)

## ▼ Classroom Set-up

### ▼ Total Time: 90 minutes

| | |
|---|---|
| Opening- Large Group | 15 min. |
| First Activity- Large Group | 20 min. |
| Second Activity- Large Group | 30 min. |
| Third Activity- Large Group | 20 min. |
| Ending- Large Group | 5 min. |

▼ Key — Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet


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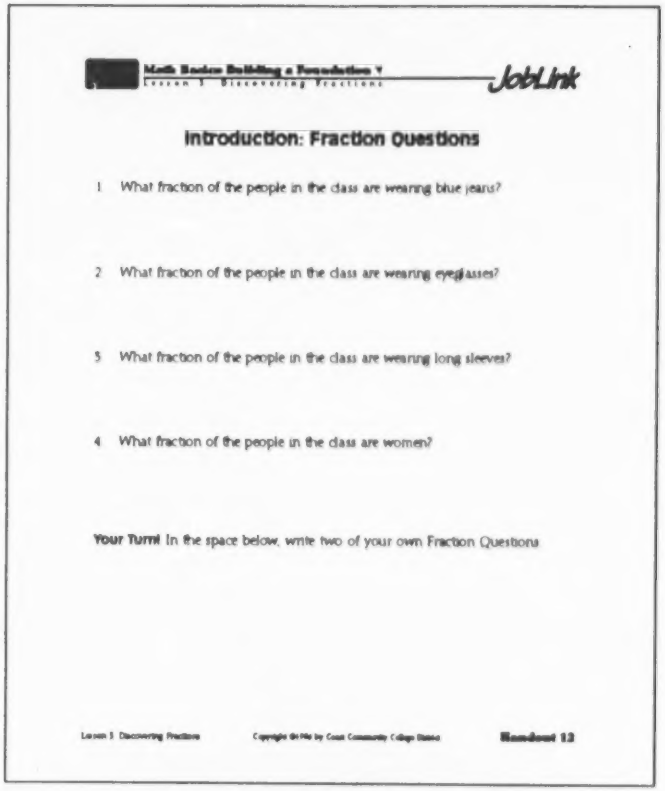

Math Basics: Building a Foundation ▼
Lesson 3: Discovering Fractions
JobLink

**Introduction: Fraction Questions**

1. What fraction of the people in the class are wearing blue jeans?

2. What fraction of the people in the class are wearing eyeglasses?

3. What fraction of the people in the class are wearing long sleeves?

4. What fraction of the people in the class are women?

**Your Turn!** In the space below, write two of your own Fraction Questions.

Lesson 3: Discovering Fractions  Copyright ©1996 by Coast Community College District  Handout 12

**Handout 12, Transparency 12**


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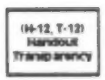
# ▼ Activities

## ▼ Opening: 15 Minutes

1. **Start** the lesson with a concrete example. **Say,** "In a group of, for example, 20 people, each person is 1/20 of that group. In a group of 25 people, each person is 1/25 of that group." **Make sure** employees understand the concept before continuing. Then say: "Here, all of us together make one whole group, and each person here is one part or fraction of that group."

2. **Say,** "How many people are in our group–that is, here in this room?" **Wait** for an accurate response. **Continue:** "Now that we know how many people make up this group, what fraction of the class does each person represent?"

3. **Summarize** the findings: "In our group here today, we are ____ people" (**Insert** *the total number in your group*). **Continue:** "Thus each person here is *one part of* ____. To express this fraction, we write 1/ ___" (**write** *the appropriate fraction on the board*).




4. **Distribute** "Introduction: Fraction Questions" and **project** it on the overhead. **Ask** employees to answer each question. **Check** for understanding after each question; for example, when someone has the right answer, **ask** that person to explain how she or he got the answer.

5. When employees have answered all four questions, **invite** them to create their own. **Say**, "At the bottom of the worksheet, write your own fraction questions." **Allow** them time to develop their questions. **Devote** the rest of the class period to the employees' fraction questions:

   (a) **Ask** employees to share their questions with the class and (b) **ask** the class to compute each answer.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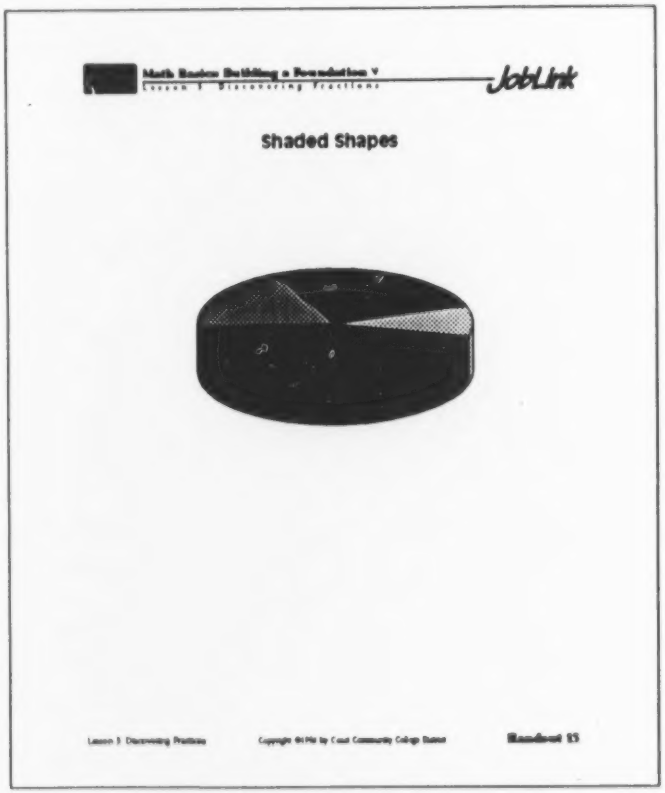


**Handout 13, Transparency 13**


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# ▼ Activities

## ▼ First Activity: 20 Minutes

1. **Review** that the class is a *whole (one group)* and that the individual employees are *fractions (parts of that group)*. The word *fraction* comes from the word *fracture*, which means "to break." Fractions were once called *"broken numbers."*

2. **Project** "Shaded Shapes" on the overhead and **distribute** it to the class. **Use** these shapes to explain why we write fractions in numerators and denominators. To begin, **remind** employees that fractions are always written in two numbers, one over the other. Now, using the shapes, **emphasize** that:

    a. The total number of pieces that make up the shape and represent the whole is the **denominator**, the *bottom* number in a written fraction.

    b. The number of shaded pieces represents a *part of* or a *fraction* of the whole and is the **numerator**, the *top* number in the written fraction.

3. **Relate** this new numerator-denominator information to the opening activity. Remind the class how we used the total number of employees as the whole, the *denominator* in every example.

4. **Ask** class members to help write the fractions on the board.


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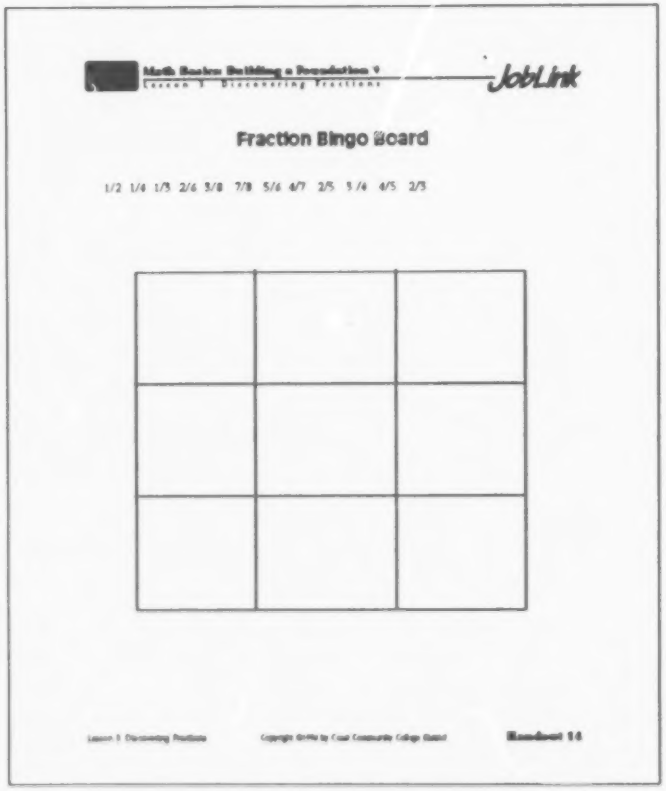


**Handout 14, Transparency 14**


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# ▼ Activities

## ▼ First Activity: (continued)

(H-14, T-14) Handout Transparency

5. **Tell** the employees that they will now play Fraction Bingo, a game that will help them understand fractions. **Distribute** "Fraction Bingo Board" and **project** it on the overhead. **Explain** the game:

   a. "You now have a blank Fraction Bingo Board with 9 empty slots. In each slot, draw a shape with shaded parts, similar to the Shaded Shapes worksheet we worked on earlier. Together, your shaded parts represent a fraction."

   b. "To choose your 9 fractions, select from the list at the top of the Fraction Bingo Board. I'll give you time to draw and to shade your shapes."

   c. "When everyone is finished drawing, I'll call out fractions at random. If you have that fraction, put a large check mark in that box. The person who gets all 9 boxes first is the winner!"

6. **Start** the game. **Call out** fractions in random order:

   1/2, 1/4, 1/3, 2/6, 3/8, 7/8, 5/6, 4/7, 2/5, 3/4, 4/5, 2/3

7. **Check** to see that the employees correctly marked off the boxes. **Invite** employees to ask questions.


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# ▼ Activities

## ▼ Second Activity: 30 Minutes

1. **Use** questions developed by employees in the Opening Activity to create word problems that require adding fractions with the same denominator. Say, "Add the fraction of people wearing blue jeans with the fraction of people with long sleeves. What fraction is the answer?"

2. **Demonstrate** on the board how we add fractions; for example, 7/25 + 8/25 = 15/25. **Stress** that we add *only the top numbers;* the bottom number stays the same. **Explain** that the bottom number is unchanged because it represents the whole, and the "whole" has not changed!

3. **Use** information from the Opening Activity to generate more questions.

4. **Explain** that subtracting fractions works the same way as adding fractions–that is, only the top numbers change; the denominator stays the same.

5. **Give** employees subtraction word problems to complete. For example, call four employees to the front, three who are wearing watches and one who isn't. Now **tell** the class, "Of these four employees, 3/4 are wearing watches." Now **ask** one of the three wearing a watch to remove it. **Write** on the board, 3/4 – 1/4 = 2/4. **Say,** "Now only 2/4 of these people are still wearing a watch."


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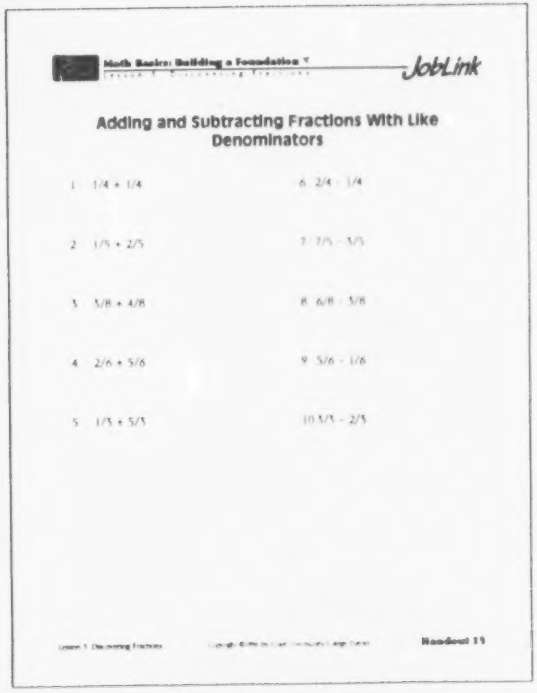
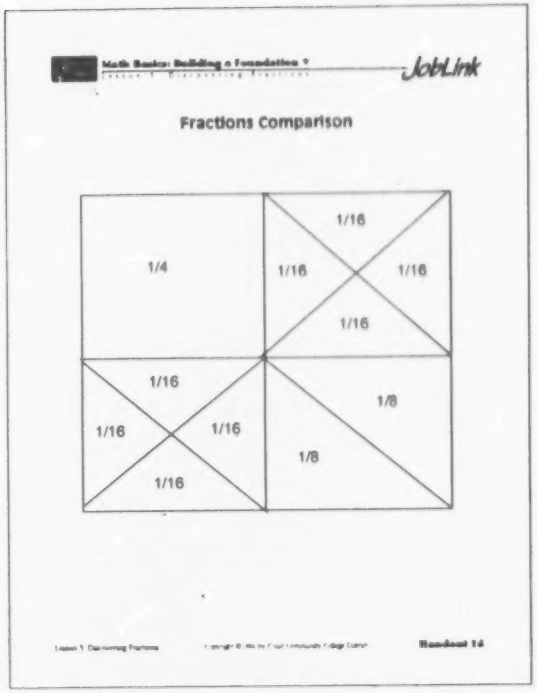

Math Basics: Building a Foundation ▼ JobLink

Adding and Subtracting Fractions With Like Denominators

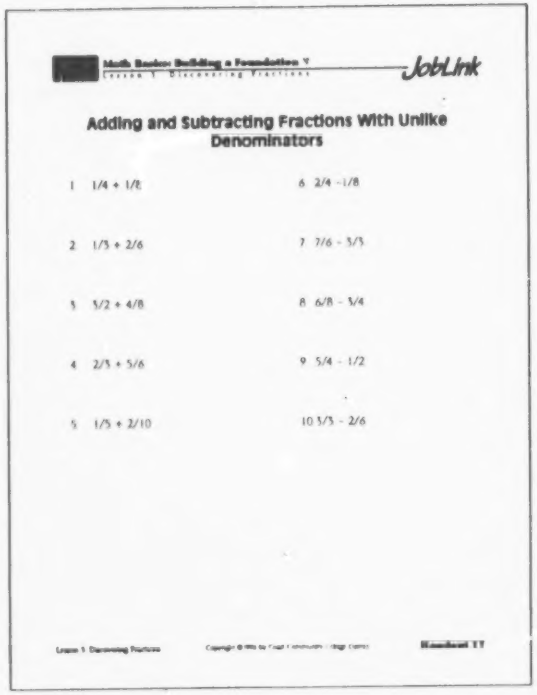
1. 1/4 + 1/4
2. 1/5 + 2/5
3. 5/8 + 4/8
4. 2/6 + 5/6
5. 1/3 + 5/3
6. 2/4 - 1/4
7. 7/5 - 3/5
8. 6/8 - 5/8
9. 5/6 - 1/6
10. 5/3 - 2/3

Handout 15

**Handout 15, Transparency 15**




**Handout 16, Transparency 16**


Math Basics: Building a Foundation ▼
JobLink
Adding and Subtracting Fractions With Unlike Denominators
1. 1/4 + 1/8
2. 1/3 + 2/6
3. 5/2 + 4/8
4. 2/3 + 5/6
5. 1/5 + 2/10
6. 2/4 - 1/8
7. 7/6 - 5/3
8. 6/8 - 3/4
9. 5/4 - 1/2
10. 5/3 - 2/6

**Handout 17, Transparency 17**

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# ▼ Activities

## ▼ Second Activity: (continued)

6. **Ask** the class, "What is similar between adding and subtracting fractions?"

(H-15, T-15) Handout Transparency

7. **Distribute** "Adding and Subtracting Fractions With Like Denominators" to the class and **project** it on the overhead. **Instruct** the class to complete the exercises. **Monitor** employees' progress. **Stress** that this method for adding and subtracting works only with fractions that have the same denominator.

(H-16, T-16) Handout Transparency

8. **Distribute** and **project** "Fractions Comparison" on the overhead. Using the illustration, **explain** why 4/16 = 1/4 and why 2/8 = 1/4. When employees understand these, **expand** the discussion to other fractions and **explain** why 1/2 = 2/4, why 1/4 = 2/8, why 1/8 = 2/16 and so on. If you wish, **use** the circular fraction tiles to demonstrate why 1/3 = 2/6, and so on.

9. **Write** this problem on the board: 1 /2 + 1/4. **Demonstrate** changing 1/2 to 2/4. Now **rewrite** the problem as follows: 2/4 + 1 /4 = 3/4. **Repeat** the same procedure with different examples.

(H-17, T-17) Handout Transparency

10. **Distribute** and **project** "Adding and Subtracting Fractions With Unlike Denominators" to the class. **Allow** employees time to work on the problems, and **monitor** their progress as they work.






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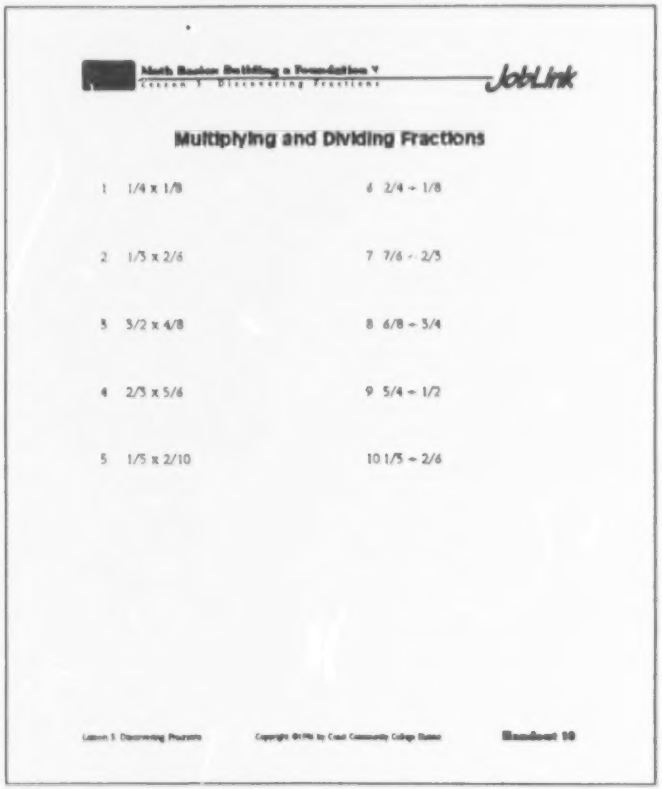


**Handout 18, Transparency 18**


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# ▼ Activities

## ▼ Third Activity: 20 Minutes

1. **Demonstrate** how to multiply two fractions. **Write** on the board, for example, 3/4 x 1/2. **Explain** the process as you multiply the top numbers (3 x 1 = 3) and the bottom numbers (4 x 2 = 8), and **stress** the solution to the class: 3/4 x 1/2 = 3/8.

2. **Demonstrate** how to divide two fractions. **Write** on the board, for example, 3/4 ÷ 1/2. Then explain the process as you **demonstrate** it step by step:

   Step 1: Write the first fraction exactly; for this example, write 3/4.

   Step 2: Change the operating sign *from* divide (÷) to multiply (x).

   Step 3: Flip the second fraction; in this example, 1/2 flips to 2/1.

   **Dramatize** the transition by writing the *original* problem (3/4 ÷ 1/2) side by side next to the *revised* problem (3/4 x 2/1). Then **say** to the class, "Now you simply multiply the two fractions, as you learned earlier. What is the answer?" Allow them sufficient time to work on the problem before giving them the answer: 6/4.

3. **Distribute** and **project** "Multiplying and Dividing Fractions". **Allow** employees time to work on the problems, and monitor their progress as they work.


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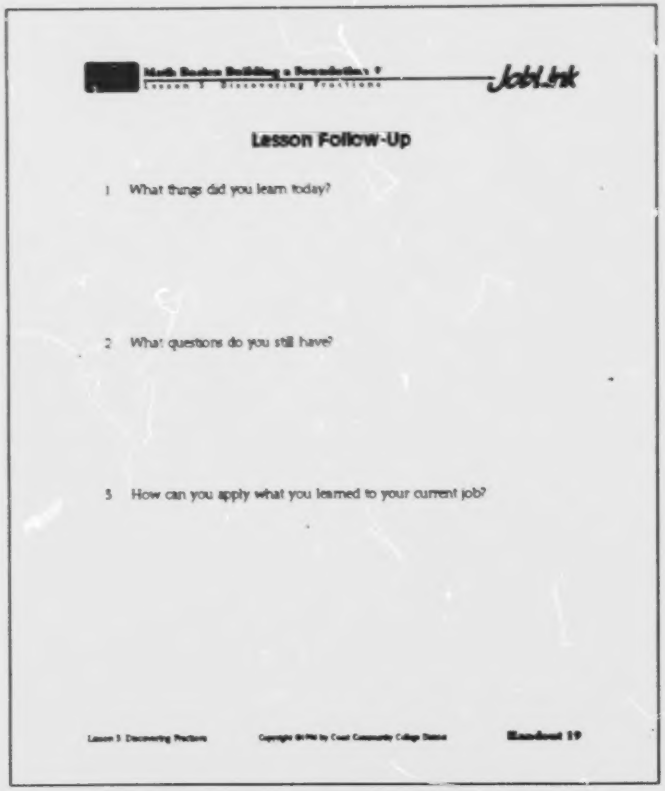

Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?

**Handout 19, Transparency 19**


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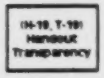
# ▼ Activities

## ▼ Ending: 5 Minutes

1. **Distribute** "Lesson Follow-Up" and **project** it on the overhead. **Allow** employees time to fill out the form.




2. **Answer** any questions employees have, and **say** goodbye.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Winning At Work

# Math Basics

## Building a Foundation

**Lesson 4**
**Discovering Decimals**

## ▼ Lesson Description

This lesson is designed to help employees understand decimals and to provide them with practice in using decimals. The lesson builds on employees' knowledge of fractions (from Lesson 3) and shows them how decimals and fractions are related. The activities provide the employees with ample opportunities to apply decimal computations that are basic to everyday real life work and personal situations.


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## ▼ Objectives

By completing this lesson, employees will be able to:

1. **Identify** the correlation between decimals and fractions.
2. **Understand** the relationship among tenths, hundredths, and thousandths.
3. **Add**, **subtract**, **multiply**, and **divide** common decimals.

## ▼ Materials Needed

### ▼ Hardware

1. Flip chart or whiteboard
2. Overhead projector
3. Transparency markers
4. Whiteboard markers

### ▼ Transparencies

"Shopping Receipt" (Transparency 20)

### ▼ Handouts

"Decimal Practice: Writing Decimal Forms" (Handout 20)

"Decimal Practice: Adding and Subtracting" (Handout 21)

"Decimal Practice: Multiplying and Dividing" (Handout 22)

"Word Problems" (Handout 23)

"Menu" (Handout 24)

"Lesson Follow-Up" (Handout 25)

## ▼ Classroom Set-up

### ▼ Total Time: 90 minutes

| | |
|---|---|
| Opening- Large Group | 10 min. |
| First Activity- Large Group | 15 min. |
| Second Activity- Large Group | 10 min. |
| Third Activity- Large Group | 20 min. |
| Fourth Activity- Small Groups | 30 min. |
| Ending- Large Group | 5 min. |





▼ Key — Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet


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# ▼ Activities

## ▼ Opening: 15 Minutes

1. **Share** with the class the goal of today's lesson: to *learn the decimal system*. **Say**, "In the last meeting we learned about *fractions*. Today we are going to learn another system for writing 'broken numbers.' It is called the ***decimal system***". **Explain** that decimals are more commonly used in the workplace because they are easier to work with than fractions–easier both with and without a calculator.

2. **Say** to the employees, "Let's review. What is a *fraction?*" **Use** the answer to relate fractions to *decimals*, and **stress** that both systems allow us to express "broken numbers," that is, a part of a whole.

3. **Explain** that the decimal system is based on tens. **Say,** "The word *decimal* is derived from a Latin word meaning 'ten.' For example, December was the *10th month* in the old Roman calendar. Note the *dec* in *December*." **Expand** the discussion to point out other words with Latin *dec* (*decade, decathlon,* etc.) and Greek deka (as in dekagram).

4. **Tell** the employees, "The secret to understanding and using the decimal system lies in seeing the numbers in *'columns.'* And the key to seeing the columns is the period–the *decimal point!* As you'll see in the First Activity, the *position* of the decimal point is critical to reading any decimal figure accurately."


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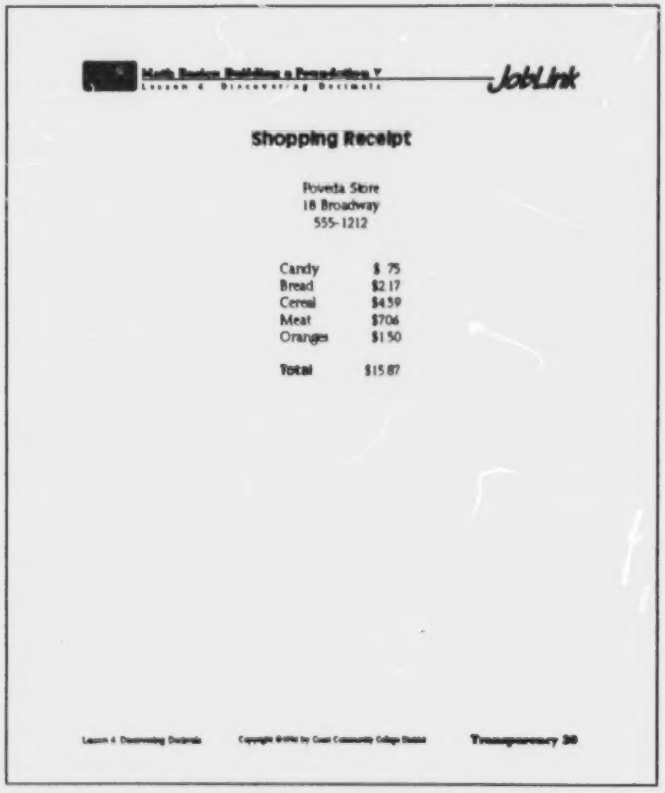


**Transparency 20**


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# ▼ Activities

## ▼ First Activity: 15 Minutes

1. **Use** money to explain the decimal system. **Say,** "Whenever we are working with money, we are working with *decimals*. Now you have one excellent reason to learn the decimal system! Let's see how we use decimals with money."

2. **Ask:**
   "How many dimes are in one dollar?" [**Write** the answer–*10*–on the board.]
   "What fraction of one dollar is a dime?" [**Write** the answer–*1/10*–on the board.]

   **Say,** "In fraction form, we write *1/10;* in decimal form we write *.10*. Thus, 1/10 = .10." **Lead** the employees to see the reciprocal relationship of the examples above and below.

3. **Ask:**
   "How many cents are in one dollar?" [**Write** the answer–*100*–on the board.]
   "What fraction of a dollar is one cent?" [**Write** the answer–*1/100*–on the board.]

   **Say,** "In fraction form, we write *1/100*; in decimal form, *.01*. Thus, 1/100 = .01."

IT-20 Transparency

4. **Project** "Shopping Receipt" on the overhead. **Point to** *$0.75* and **say,** "How do you read the first price, the cost for the entry *Candy?*" **Wait** until someone volunteers "seventy-five cents"; then use the answer to stress that we do ***not*** say *"three-fourths of a dollar"*! **Point to** the dollar sign and explain that the *unit of measurement* here is dollars; **explain** how other units of measurement–for example, *miles* and acres–are used.

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Math Basics: Building a Foundation ▼
Lesson 4: Discovering Decimals
JobLink

**Decimal Practice:**
**Writing Decimal Forms**

In the space provided, write in decimal form the total of the coins in Column 1. Follow the example.

| | Coins | Written in Decimal Form |
|---|---|---|
| ex. | 3 dimes and 4 cents | $0.34 |
| 1. | 4 dimes and 7 cents | $_____ |
| 2. | 8 cents | $_____ |
| 3. | 7 dimes and 5 cents | $_____ |
| 4. | 0 dimes and 7 cents | $_____ |
| 5. | 5 dimes and 6 cents | $_____ |
| 6. | 8 dimes and 0 cents | $_____ |
| 7. | 65 cents | $_____ |
| 8. | 5 dimes | $_____ |
| 9. | 9 cents | $_____ |
| 10. | 60 cents | $_____ |

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**Handout 20**


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## ▼ Activities

### ▼ First Activity: (continued)

5. **Use** the receipt amounts to discuss the value that each "column" represents in the decimal system. **Point to** *Bread $2.17.* Then **show** how each column to the *left* of the decimal point represents *whole* numbers and each column to the *right* of the decimal point represents *parts* of numbers.

   **Say:** "The 2 in this position means two dollars–two *whole* dollars. The first column to the *right* of the decimal point represents dimes. Here we have how many dimes? One dime!"

   "And the second column to the *right* of the decimal point represents cents (pennies). Here we have how many cents? *Seven!* Without the whole-dollar amount, we would write one dime and seven cents (or *seventeen cents)* like this ..." **Write** *$0.17* on the board.

   Now **say,** "In fraction form, the decimal *.17* would be written *17/100.*" **Write** 17/100 on the board.

6. **Distribute** "Decimal Practice: Writing Decimal Forms." Use the example to illustrate the system for writing decimal forms. **Allow** employees to work in pairs if they wish. **Correct** the worksheet with the class.


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# ▼ Activities

## ▼ Second Activity: 10 Minutes

1. **Expand on** the concept that our system of writing numbers is based on 10. **Say,** "Let's look at this number." **Write** 5678 on the board. **Ask,** "How do we *read* this number? How do we interpret its *value*?"

2. **Explain** what each number represents. **Say,** "Here, the number *5* represents thousands, the *6* represents hundreds, the *7* represents tens, and the *8* represents ones". **Stress** that the core values are positional! Continue: "Now here this is the key to understanding the decimal system:

   "Each move to the *left increases* value ten times!
   "Each move to the *right decreases* value by one tenth!"

3. **Repeat** the value of each "place" in the number *5678*, starting from ones and working to thousands. Now **label** each place value in a different-color marker. Above the number 5678 **write** *Thousands, Hundreds, Tens,* and *Ones.*

4. Now **say,** "Let's change this number. Let's add to it." **Insert** a decimal point and add to the base number: *5678.1234.*

5. **Say,** "Note that the new number is still *smaller than 5679*! Why? Because we did not add a *whole* number; we added only a *fraction* of 1." **Lead** the class to understand why .1234 is less than 1 and why the number represents a value less than 567**9**.


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## ▼ Activities

### ▼ Second Activity: (continued)

6. Now **point to** each new place, **identify** it for the class, and **write** its label in a different-color marker, just as you did for the other labels. **Write** *Tenths, Hundredths, Thousandths,* and *Ten Thousandths.* **Say,** "Note the difference between Tens and Ten**th**s, between Hundreds and Hund**red**ths, and so on. When we add "th," we are identifying a place to the *right* of the decimal–that is, we are identifying *'part of.'*

7. **Dramatize** the meanings of the new places. **Point to** each place as you **explain**: "This is called the Tenths place. It tells us 'how many tenths' we have." **Ask,** "How many?" Wait for someone to volunteer "one." Repeat this procedure for each place.

8. **Stress** that each place to the right *decreases* the value by one-tenth of the previous place.

9. **Ask,** "Now, what symbol do we use to separate the whole numbers from the fractions?" If the class does not respond, **point to** the decimal point. **Emphasize** how the decimal point separates *whole numbers* from *part numbers.*

10. **Write** the following numbers on the board:

    0.05  0.57  2.85  1.78  20.18  7145.238

    Use each number to review the concept of place value and to practice reading decimal amounts. Emphasize how the decimal point separates, dividing the figure into whole numbers on the left and "broken numbers" on the right. To add realism to each example, include a unit of measure.




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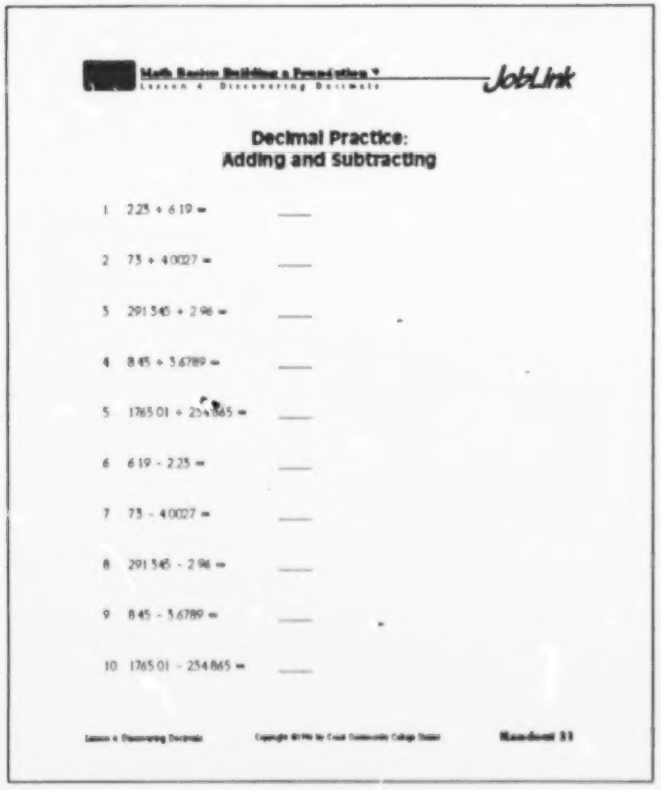

Math Basics: Building a Foundation ▼ JobLink
Lesson 4: Discovering Decimals

**Decimal Practice:**
**Adding and Subtracting**

1. 2.25 + 6.19 = ____
2. 73 + 4.0027 = ____
3. 291.345 + 2.96 = ____
4. 8.45 + 5.6789 = ____
5. 1765.01 + 254.865 = ____
6. 6.19 - 2.25 = ____
7. 73 - 4.0027 = ____
8. 291.345 - 2.96 = ____
9. 8.45 - 5.6789 = ____
10. 1765.01 - 254.865 = ____

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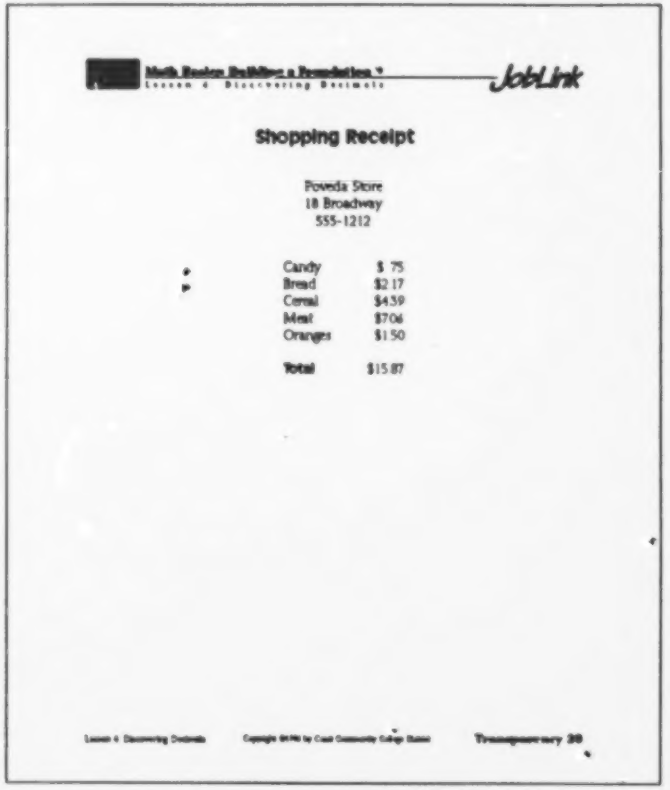
**Handout 21**



Math Basics: Building a Foundation ▼ JobLink
Lesson 4: Discovering Decimals

**Shopping Receipt**

Poveda Store
18 Broadway
555-1212

| | |
|---|---|
| Candy | $.75 |
| Bread | $2.17 |
| Cereal | $4.59 |
| Meat | $7.06 |
| Oranges | $1.50 |
| **Total** | $15.87 |

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**Transparency 20**


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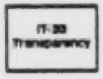
# ▼ Activities

## ▼ Third Activity: 20 Minutes

1. **Say**, "Now that you are all experts in writing and identifying decimals, we can practice *adding* decimal numbers." **Display** "Shopping Receipt" on the overhead again. **Ask,** "What is the cost for *Candy* and *Bread* alone? Let's add these to find out."



2. **Explain** that the "trick" to adding decimals is to *line up the decimal points*. **Write** on the board $.75 and $2.17, and **stress** the decimal alignment. **Explain** that $.75 and $0.75 are the same, and **show** how the zero does not affect addition **IF** the numbers are aligned. **Ask** a volunteer to come to the board and add the numbers.

3. **Explain** that subtraction, too, relies on *correct decimal alignment*. **Ask,** "If you give the clerk a twenty-dollar bill, how much change should you receive?" **Write** $20.00 – $15.87 in columns, and ask a second volunteer to come to the board and subtract. **Create** other problems using the Shopping Receipt. For example, **say,** "If you were buying only *Meat* and *Oranges*, how much would you pay?" **Then:** "How much change will you get if you pay for the meat and oranges with a ten-dollar bill?" For each example, **emphasize** the need to line up the decimals.

4. **Distribute** "Decimal Practice: Adding and Subtracting", and ask the class to complete the problems. **Give** the class this hint: **Tell** them they must rewrite the problems in column form, aligning the decimal points of course. **Allow** enough time to finish the problems; then **correct** them with the class.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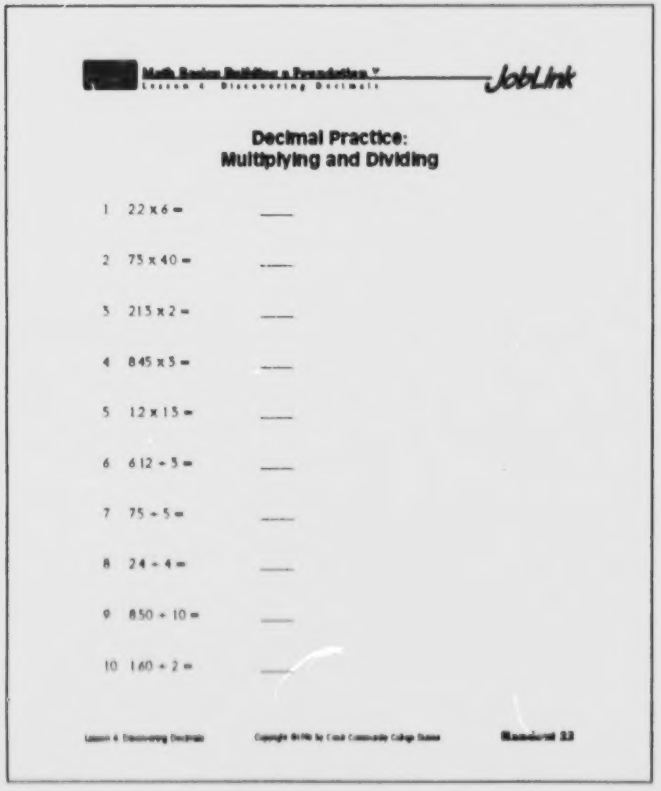

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Lesson 4: Discovering Decimals

**Decimal Practice:**
**Multiplying and Dividing**

1. 22 x 6 = ____
2. 75 x 40 = ____
3. 215 x 2 = ____
4. 845 x 5 = ____
5. 12 x 15 = ____
6. 612 ÷ 5 = ____
7. 75 ÷ 5 = ____
8. 24 ÷ 4 = ____
9. 850 ÷ 10 = ____
10. 160 ÷ 2 = ____

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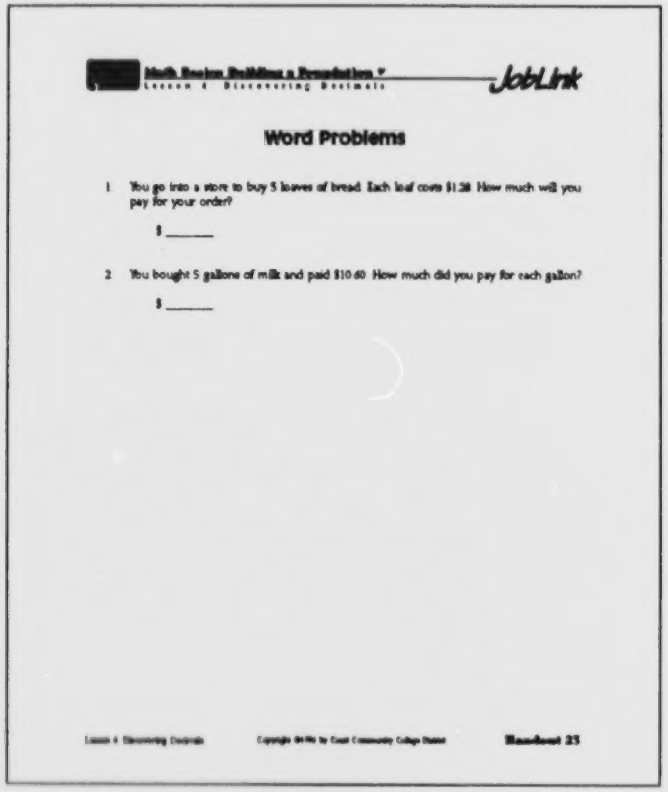
**Handout 22**



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Lesson 4: Discovering Decimals

**Word Problems**

1. You go into a store to buy 5 loaves of bread. Each loaf costs $1.28. How much will you pay for your order?

   $ _____

2. You bought 5 gallons of milk and paid $10.60. How much did you pay for each gallon?

   $ _____

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**Handout 23**


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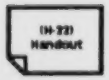
# ▼ Activities

## ▼ Third Activity: (continued)

5. **Explain** how to multiply decimal numbers. **Say,** "When you multiply decimal figures, disregard the decimals in the numbers while you are multiplying." **Write** 2.7 X 4.68 on the board. **Multiply** to get 12636. At this point, **stress** that the multiplication so far has been "normal." Now **dramatize** that 12636 cannot be the "answer." **Say,** "If we round 2.7 to 3, and 4.68 to 5, we can see that 3 X 5 would be 15. We know then the answer must be a number smaller than 15, correct?" **Pause** to make sure that everyone understands.

6. Now **continue:** "To figure out the decimal place, count the total number of positions in both numbers that you multiplied!" Now count the actual positions aloud for the class. **Say,** "One, two, three positions–that tells us to put the decimal point *3 places over from the right!* Final answer: 12.636." **Point out** that the final answer is a number smaller than 15, as we predicted through our "rounding" earlier.




7. **Distribute** "Decimal Problems: Multiplying and Dividing". **Tell** employees to complete this as a homework assignment and to bring the completed sheet to the next class.

8. **Let** the class practice multiplying simple decimal figures. **Distribute** "Word Problems". **Read** Word Problem 1 aloud. **Ask,** "How would you calculate the answer?" **Let** a volunteer go to the board. If necessary, help him or her to write $1.28 X 5 in column form. **Allow** time to figure out the answer: $6.40. **Review** the process with the class.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## ▼ Activities

### ▼ Third Activity: (continued)

9. **Erase** the answer, erase the dollar sign, and change the 5 to 5.2. Now **multiply** 1.28 X 5.2 step by step to get 6656. At the end, **dramatize** the counting of the 3 decimal places before you place the decimal point in the answer: 6.656.

10. Now **read** Word Problem 2 aloud. **Ask,** "How would you solve this problem?" **Wait** for a volunteer to explain that she would divide $10.60 by 5 to get the unit price. **Demonstrate** the solution on the board. Answer: $2.12.


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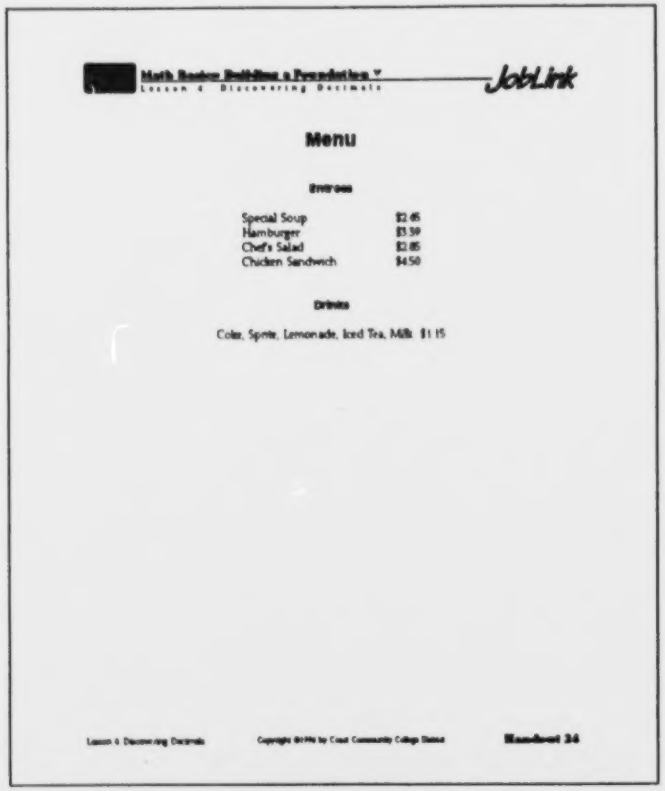

Menu

Entrees

| | |
|---|---|
| Special Soup | $2.65 |
| Hamburger | $3.39 |
| Chef's Salad | $2.85 |
| Chicken Sandwich | $4.50 |

Drinks

Coke, Sprite, Lemonade, Iced Tea, Milk $1.15

Handout 24

**Handout 24**


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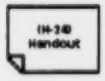
# ▼ Activities

## ▼ Fourth Activity: 30 Minutes

1. **Say,** "Let's practice our math skills in a common real life situation." **Instruct** the class to break into groups of four. **Distribute** one Menu to each group. .




2. **Instruct** each group to name one Waiter; all others will be Diners. Each Diner must order at least one drink and one entree. The Waiter will calculate the total bill (using any method). In each group, Diner 1 will calculate the total of the entrees. Diner 2 will calculate the total of the drinks (by multiplication, not by addition). Diner 3 will calculate the correct change if they give the waiter $20.00. Each person is responsible for checking one another's work. **Allow** the class time for role-playing.

3. **Reassemble** the class, and **discuss** the results of the activity.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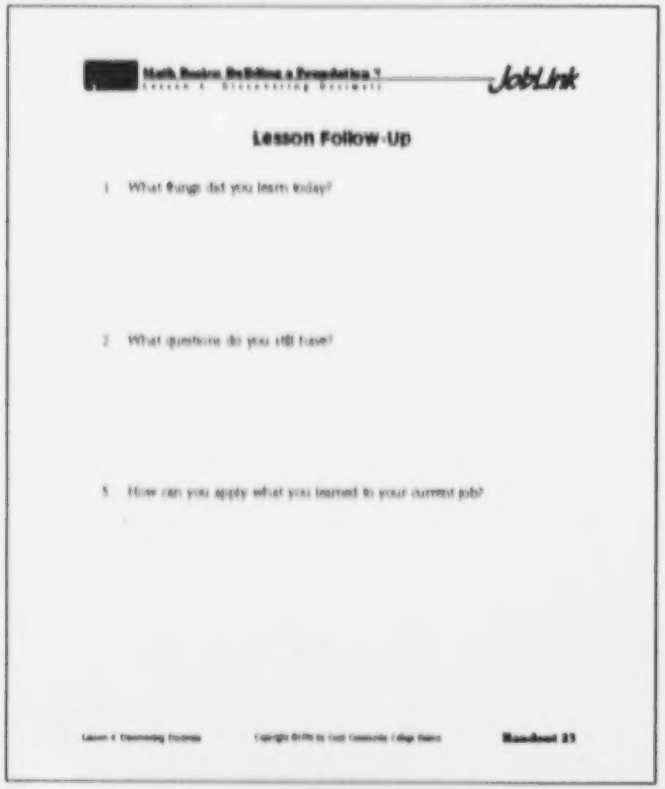

Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?

Handout 25

**Handout 25**


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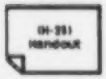
## ▼ Activities

### ▼ Ending: 5 Minutes

1. **Distribute** "Lesson Follow-Up" and **ask** employees to fill out the form.



2. **Answer** any questions that they may still have, and say goodbye.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JobLink

Winning At Work

# Math Basics

## Building a Foundation

**Lesson 5**
**Rates, Ratios, Proportions and Percents**

## ▼ Lesson Description

In this lesson employees learn to distinguish between *rates, ratios,* and *proportions* and to express them in writing. They also learn how to compute proportions. In addition, employees learn the meaning of percent, and they learn how to compute percents in real life situations. The lesson underscores the usefulness and practicality of understanding *rates, ratios, proportions,* and *percents* in everyday life.


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## ▼ Objectives

By completing this lesson, employees will be able to:

1. **Distinguish** among *rates, ratios,* and *proportions.*
2. **Understand** how percents are used in the business world and in our personal lives.
3. **Understand** the relationships among *rates, ratios, proportions,* and *percents.*

## ▼ Materials Needed

### ▼ Hardware

1. Flip chart or whiteboard
2. Overhead projector
3. Transparency markers
4. Whiteboard markers

### ▼ Transparencies

"Sample Cookie Recipe" (Transparency 21)
"Solving Proportion Problems Step by Step" (Transparency 22)

### ▼ Handouts

"Proportion Problems" (Handout 26)
"Trip Chart" (Handout 27)
"Percent Practice" (Handout 28)
"Lesson Follow-Up" (Handout 29)

## ▼ Classroom Set-up

### ▼ Total Time: 90 minutes

| | |
|---|---|
| Opening- Large Group | 20 min. |
| First Activity- Large Group | 20 min. |
| Second Activity- Large Group | 25 min. |
| Third Activity- Large Group | 20 min. |
| Ending- Large Group | 5 min. |

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▼ Key — Hardware, Transparencies, Handouts, Large Group, Small Groups, Discussion, Sign-in Sheet


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# ▼ Activities

## ▼ Opening: 20 Minutes

1. **Welcome** the class. **Tell** them that they are about to learn some very useful math skills. **Build** their confidence by assuring them that you will present these skills step by step.

2. **Ask** if anyone can explain the meaning of *rate, ratio,* or *proportion.* (Do not be surprised if you get no responses.) **Tell** the class:

    a. Car speed is a rate.
    b. Cooking instructions have ratios.
    c. Fractions are proportions.

3. **Write** on the board *65 mph* and *65 mi/hr.* **Explain** that both *mph* and *mi/hr* mean "miles per hour." **Stress** that a rate *compares two specific items,* in this case, *distance* and *time.*

4. **Ask** the class to write down any simple recipe they know. **Say,** "Be sure to include quantities, such as 2 tablespoons of butter, 1 egg, etc." **Use** their sample recipes to identify the ratios among ingredients.

5. **Say,** "A recipe that calls for 2 tablespoons of butter and 1 egg uses these ingredients in a *two-to-one ratio.*" **Write** *2:1* on the board and **explain** how the colon is used in ratio notation. Then **ask,** "If a recipe calls for 3 cups of milk with 2 tablespoons of sugar, what is the ratio of these two ingredients?" **Wait** until someone gives the right answer, and then write *3:2* on the board.

6. **Allow** employees time to practice writing ratios using the recipes they wrote earlier.


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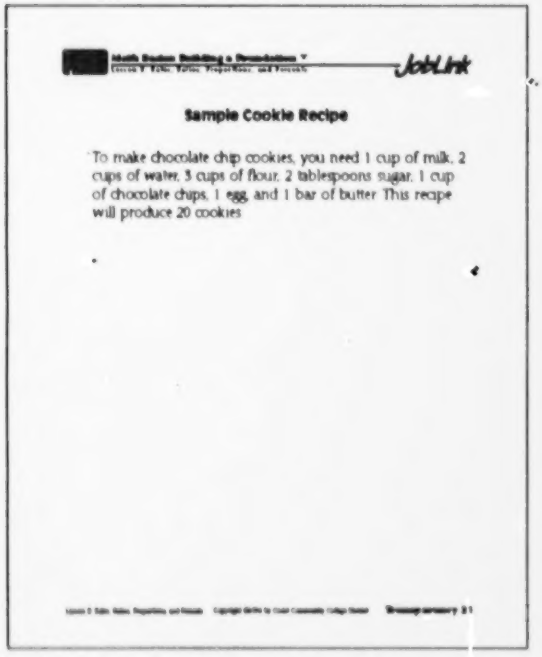
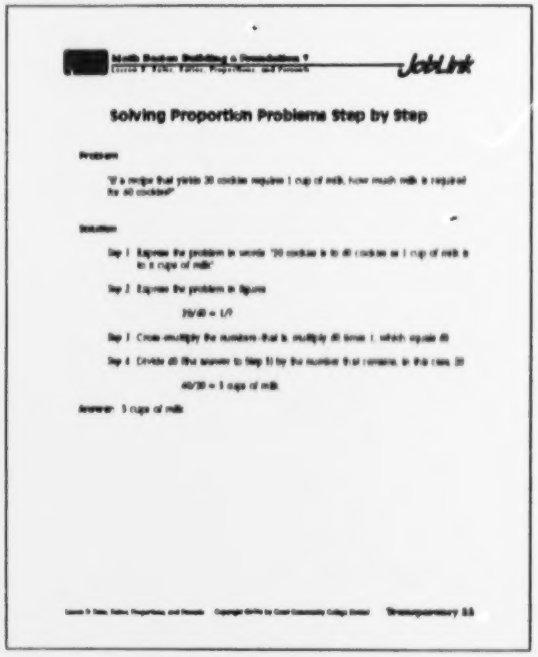


Sample Cookie Recipe

To make chocolate chip cookies, you need 1 cup of milk, 2 cups of water, 3 cups of flour, 2 tablespoons sugar, 1 cup of chocolate chips, 1 egg, and 1 bar of butter. This recipe will produce 20 cookies.

**Transparency 21**



Solving Proportion Problems Step by Step

**Problem**

"If a recipe that yields 20 cookies requires 1 cup of milk, how much milk is required for 40 cookies?"

**Solution**

Step 1: Express the problem in words: "20 cookies is to 40 cookies as 1 cup of milk is to x cups of milk."

Step 2: Express the problem in figures:

20/40 = 1/?

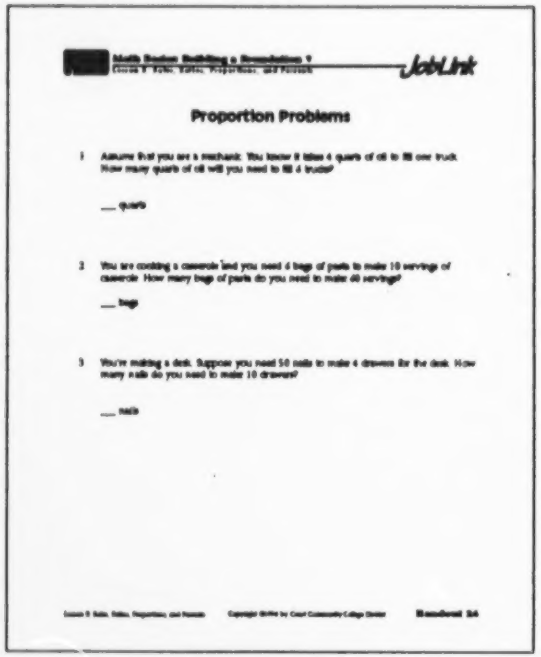
Step 3: Cross-multiply the numbers: that is, multiply 40 times 1, which equals 40.

Step 4: Divide 40 (the answer to Step 3) by the number that remains, in this case, 20:

40/20 = 2 cups of milk

Answer: 2 cups of milk

**Transparency 22**



Proportion Problems

1. Assume that you are a mechanic. You know it takes 4 quarts of oil to fill one truck. How many quarts of oil will you need to fill 4 trucks?

   ___ quarts

2. You are cooking a casserole and you need 4 bags of pasta to make 10 servings of casserole. How many bags of pasta do you need to make 40 servings?

   ___ bags

3. You're making a desk. Suppose you need 50 nails to make 4 drawers for the desk. How many nails do you need to make 10 drawers?

   ___ nails

**Handout 26**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# ▼ Activities

## ▼ First Activity: 20 Minutes

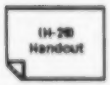
1. **Say,** "To solve certain problems, we can use ratios to write a *proportion*. A proportion is a fraction that is used to calculate specific information."

2. **Project** "Sample Cookie Recipe" on the overhead. **Say,** "According to the recipe, the quantities given will yield 20 cookies. Now, what if you wanted to make not 20, but 60 cookies–*how much milk do you need*? Let's set up a proportion to answer this question." On the board, **write:**

   $$20/60 = 1/?$$

   **Point out** that each side of the equals sign has a fraction, and **explain** that the question mark represents an unknown value. **Say,** "Now let's see how to solve for this unknown amount."

3. **Project** "Solving Proportion Problems Step by Step" on the overhead, and **use** it to **explain** the process of solving proportions. **Make sure** that employees understand why the answer is 3 cups of milk. **Remind** employees that this process can be used to solve any proportion problem.




4. **Distribute** "Proportion Problems" and **allow** employees time to work out the problems.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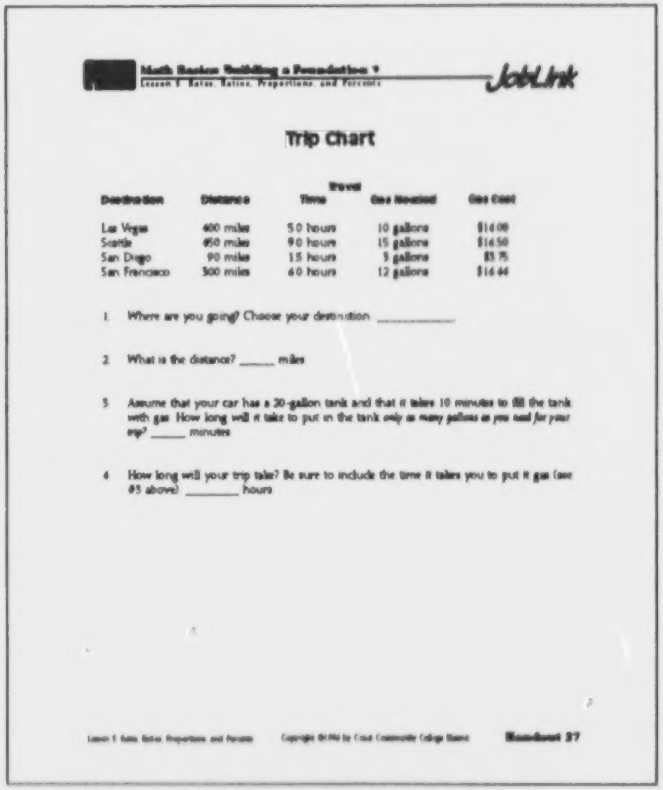

Math Basics: Building a Foundation ▼
Lesson 5: Rates, Ratios, Proportions, and Percents
JobLink

## Trip Chart

| Destination | Distance | Travel Time | Gas Needed | Gas Cost |
|---|---|---|---|---|
| Las Vegas | 400 miles | 5.0 hours | 10 gallons | $16.00 |
| Seattle | 950 miles | 9.0 hours | 15 gallons | $16.50 |
| San Diego | 90 miles | 1.5 hours | 5 gallons | $3.75 |
| San Francisco | 500 miles | 6.0 hours | 12 gallons | $16.44 |

1. Where are you going? Choose your destination. _____

2. What is the distance? _____ miles

3. Assume that your car has a 20-gallon tank and that it takes 10 minutes to fill the tank with gas. How long will it take to put in the tank only as many gallons as you need for your trip? _____ minutes

4. How long will your trip take? Be sure to include the time it takes you to put it gas (see #3 above) _____ hours

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**Handout 27**


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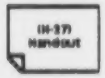
# ▼ Activities

## ▼ Second Activity: 25 Minutes

1. **Distribute** "Trip Chart" **Tell** the employees that they are going to be taking a trip and that they will need to plan:



Where they are going?
How far is it?
How long does it take?

2. **Tell** employees to use the Trip Chart to calculate the speed traveled, the number of miles traveled per gallon of gasoline, the price of each gallon, etc. **Instruct** employees to fill in their answers in the spaces provided. **Remind** them to add to their travel time the time needed to fill up the gas tank.

3. **Discuss** the employees' calculations in detail to underscore the basic math concepts of this lesson.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# ▼ Activities

## ▼ Third Activity: 20 Minutes

1. **Say,** "We are now going to look at a very important topic: *percentage*. Every time you go to the store, you have opportunities to compute percents."

2. **Tell** the class that percent means "per hundred, or part of one hundred." **Explain** how percents and decimals are related. **Remind** employees of the place value of decimals, because they will need to know the decimal system to work with percentages.

3. **Demonstrate** on the board how to change a percent to a decimal. **Say,** "If you want to change 18% to a decimal value, (a) take away the percent symbol, (b) move the decimal 2 places to the left, and (c) write the answer, which is .18." **Stress** the decimal position.

4. **Ask** the class, "In our daily lives, where do we see percents?" **Elicit** responses to show that we encounter percents in banks, in stores, in the newspapers, etc., on a daily basis. **Encourage** them by asking, "How are sale prices usually marked? [Pause ... ] 20% off, 25% off, and so on. To calculate the price you must pay, you must figure out the *percent discount* you will get."

5. **Say** the following problem aloud, and **write** the figures (the cost and the discount) on the board: "If a shirt costs $10.00 and it's on sale at 25% off, what is the final price of the shirt?"




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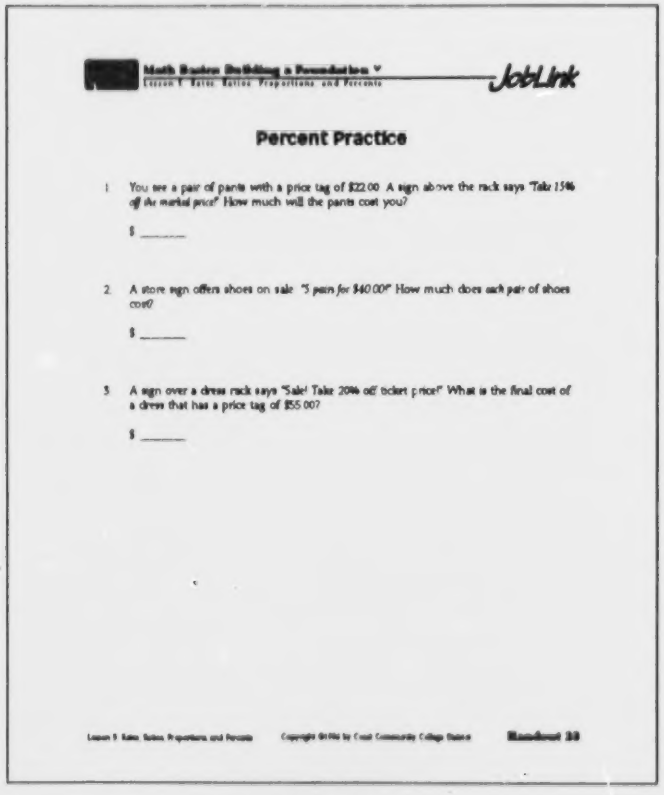

Math Basics: Building a Foundation ▼
Lesson 5: Rates, Ratios, Proportions, and Percents
JobLink

**Percent Practice**

1. You see a pair of pants with a price tag of $22.00. A sign above the rack says "Take 15% off the marked price!" How much will the pants cost you?

   $ _____

2. A store sign offers shoes on sale: "3 pairs for $40.00!" How much does each pair of shoes cost?

   $ _____

3. A sign over a dress rack says "Sale! Take 20% off ticket price!" What is the final cost of a dress that has a price tag of $55.00?

   $ _____

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**Handout 28**


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# ▼ Activities

## ▼ Second Activity: (continued)

6. **Demonstrate** the solution. **Stress** the *process!* **Say,** "Follow these steps to solve the problem:

   a. "Change 25% to .25.
   b. "Multiply $10.00 by .25. Your discount is $2.50.
   c. "Take the original price ($10.00) and subtract $2.50. You pay $7.50.

   "So, the final price of the shirt is $7.50." **Review** the steps to ensure that everyone understands the process.

7. **Say,** "Another shopping calculation involves *unit prices*. Stores use *unit* prices when they list items '10 for $5.00,' for example. As shoppers, we want to know what we're paying *per item*–that is, the *unit price*." **Ask** the class to calculate the unit cost for items marked "10 for $5.00." When someone gives the correct answer (50 cents), **review** the process of figuring out unit prices.

8. **Distribute** "Percent Practice". **Allow** the class enough time to work out the problems. Use their responses to review the concepts presented in this lesson.


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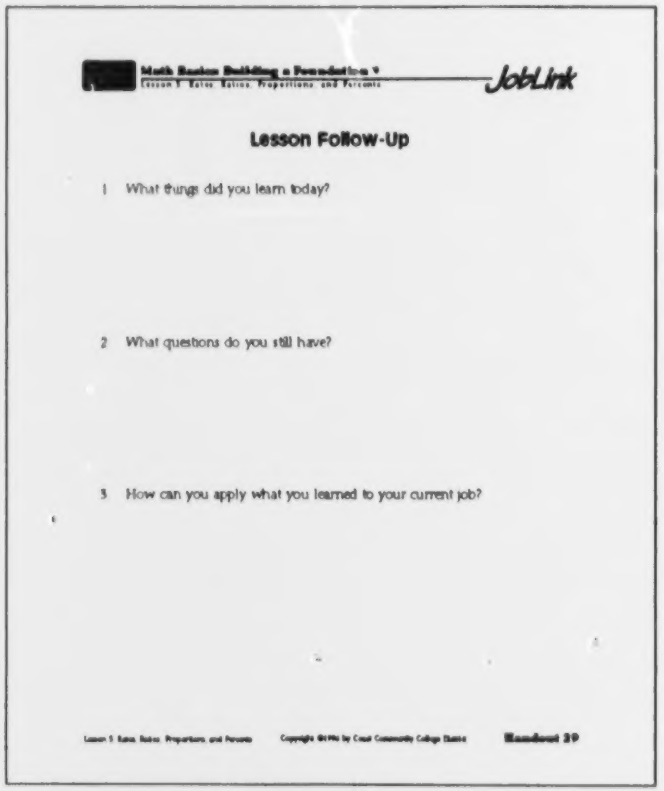

Math Basics: Building a Foundation ▼
Lesson 5: Rates, Ratios, Proportions, and Percents
JobLink

**Lesson Follow-Up**

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?

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**Handout 29**


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## ▼ *Activities*

### ▼ Ending: 5 Minutes

1. **Distribute** "Lesson Follow-Up" to employees, and **ask** them to fill it out.

2. **Answer** any questions that they have, and **say** goodbye.






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Winning At Work

# Math Basics

## Building a Foundation

**Lesson 6**
**Using the Calculator**



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## ▼ Lesson Description

To complete this module on basic math skills, this lesson acquaints employees with the basic calculator. As employees use the calculator, they review the concepts and practice the principles presented in earlier lessons.


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## ▼ Objectives

By completing this lesson, employees will be able to:

1. **Identify** all the basic calculator keys.
2. **Explain** the basic calculator functions.
3. **Use** the calculator to solve problems involving percents, decimals, or fractions.

### ▼ Forms

Posttest

Learner Assessment Form

## ▼ Materials Needed

### ▼ Hardware

1. Flip chart or whiteboard
2. Overhead projector
3. Transparency markers
4. Whiteboard markers
5. Calculators

### ▼ Transparencies

"A Look at Today's Lesson" (Transparency 23)

### ▼ Handouts

"Basic Calculations" (Handout 30)

"The Race" (Handout 31)

"Figure Out the Keys" (Handout 32)

"Estimating With a Calculator" (Handout 33)

"Fractions and Decimals With a Calculator" (Handout 34)

"Calculator Review" (Handout 35)

"Lesson Follow-Up" (Handout 36)

## ▼ Classroom Set-up

### ▼ Total Time: 90 minutes

| | |
|---|---|
| Opening- Large Group | 25 min. |
| First Activity- Large Group | 15 min. |
| Second Activity- Large Group | 25 min. |
| Third Activity- Large Group | 20 min. |
| Ending- Large Group | 5 min. |

▼ Key — Hardware, Transparencies, Handouts, Large Group, Small Groups, Discussion, Sign-in Sheet


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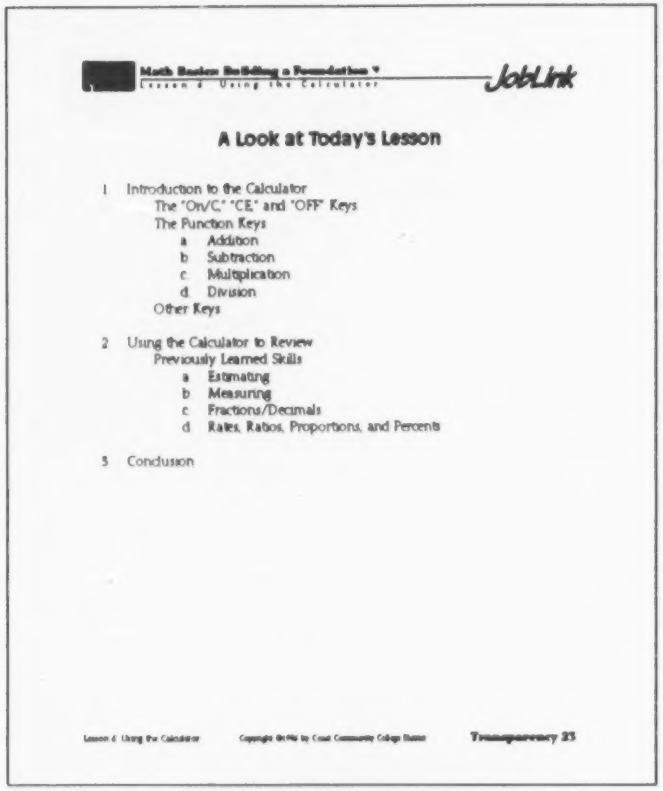


**Transparency 23**


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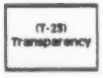
# ▼ Activities

## ▼ Opening: 25 Minutes

**Instructor:** After each activity below, **ask** the employees to explain how they used the calculator to solve the problems.

1. **Introduce** the topic of today's lesson: *the calculator.* **Explain** that by mastering calculator functions, employees will both learn a useful new tool and at the same time reinforce their understanding of basic math principles.




2. **Project** "A Look at Today's Lesson" on the overhead to show employees the plan for today's lesson.

3. **Distribute** the calculators. **Allow** the employees about 5 minutes to "explore." **Review** briefly the names of the keys and their functions; **identify** the *display area or screen.* **Explain** that specific key labels may vary slightly from brand to brand; for example, **mention** that some brands offer two "clear keys," the *On/C* key and the *CE* ("Clear Entry") key, and **explain** the distinction between the two.

4. **Instruct** employees to find and press the clear key ("C"). **Tell** them they may need to push "C" several times (if they have pressed Off, then they will need to press the On key). **Ask,** "Does your display now show a zero?"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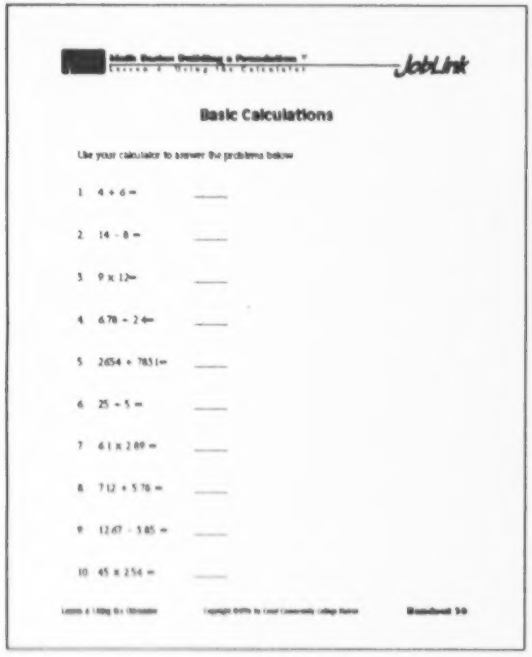
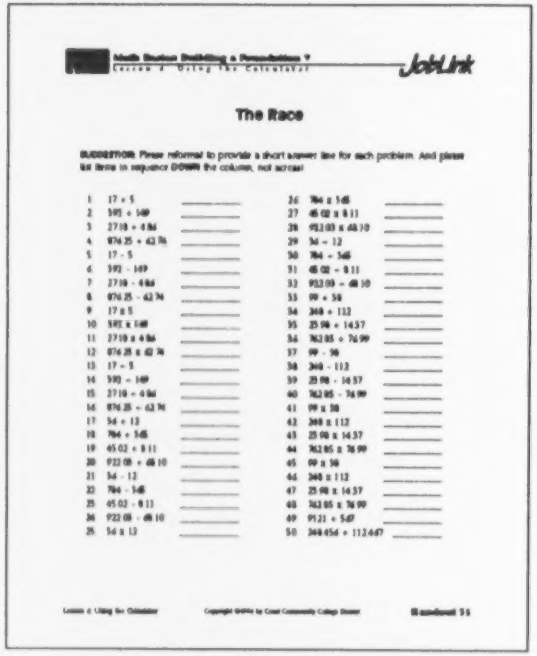


Basic Calculations

Use your calculator to answer the problems below.

1. 4 + 6 = _____
2. 14 - 8 = _____
3. 9 x 12= _____
4. 678 ÷ 24= _____
5. 2654 + 7851= _____
6. 25 ÷ 5 = _____
7. 61 x 2.89 = _____
8. 7.12 + 5.78 = _____
9. 12.67 - 5.85 = _____
10. 45 x 2.54 = _____

Handout 30



The Race

SUGGESTION: Please reformat to provide a short answer line for each problem. And please list items in sequence DOWN the column, not across!

| | | | |
|---|---|---|---|
| 1 | 17 + 5 | 26 | 784 ± 3.45 |
| 2 | 3.92 + 1.69 | 27 | 45.02 x 8.11 |
| 3 | 27.18 + 4.84 | 28 | 932.09 x 48.10 |
| 4 | 876.25 + 62.74 | 29 | 54 ÷ 12 |
| 5 | 17 - 5 | 30 | 784 ÷ 3.45 |
| 6 | 3.92 - 1.69 | 31 | 45.02 ÷ 8.11 |
| 7 | 27.18 - 4.84 | 32 | 932.09 ÷ 48.10 |
| 8 | 876.25 - 62.74 | 33 | 99 ÷ 3.8 |
| 9 | 17 ± 5 | 34 | 3.68 ÷ 1.12 |
| 10 | 3.92 x 1.69 | 35 | 25.98 + 14.37 |
| 11 | 27.18 x 4.84 | 36 | 762.85 ÷ 76.99 |
| 12 | 876.25 ± 62.74 | 37 | 99 - 3.8 |
| 13 | 17 ÷ 5 | 38 | 3.68 - 1.12 |
| 14 | 3.92 + 1.69 | 39 | 25.98 - 14.37 |
| 15 | 27.18 + 4.84 | 40 | 762.85 - 76.99 |
| 16 | 876.25 + 62.74 | 41 | 99 ± 3.8 |
| 17 | 54 + 12 | 42 | 3.68 ± 1.12 |
| 18 | 784 + 3.45 | 43 | 25.98 ± 14.37 |
| 19 | 45.02 + 8.11 | 44 | 762.85 ± 76.99 |
| 20 | 932.09 + 48.10 | 45 | 99 x 3.8 |
| 21 | 54 - 12 | 46 | 3.68 x 1.12 |
| 22 | 784 - 3.45 | 47 | 25.98 x 14.37 |
| 23 | 45.02 - 8.11 | 48 | 762.85 x 76.99 |
| 24 | 932.09 - 48.10 | 49 | 99.21 + 5.67 |
| 25 | 54 ± 12 | 50 | 349.454 + 112.647 |

Handout 31

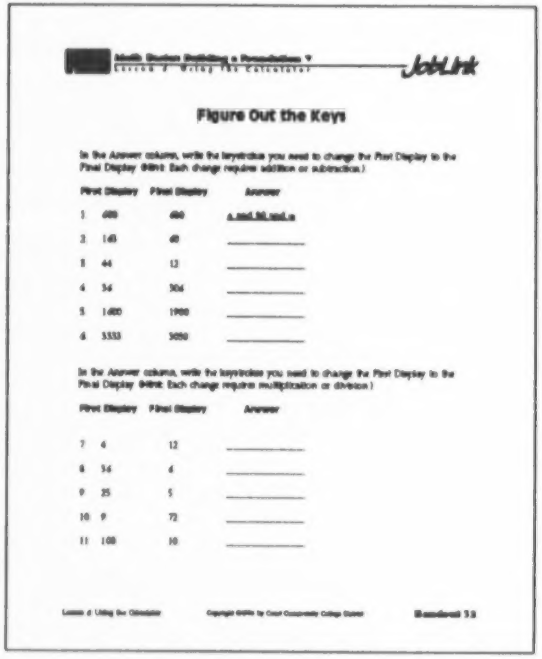


Figure Out the Keys

In the Answer column, write the keystrokes you need to change the First Display to the Final Display. (Hint: Each change requires addition or subtraction.)

| | First Display | Final Display | Answer |
|---|---|---|---|
| 1 | 400 | 450 | + and 50 and = |
| 2 | 145 | 40 | _____ |
| 3 | 44 | 12 | _____ |
| 4 | 54 | 304 | _____ |
| 5 | 1400 | 1900 | _____ |
| 6 | 3333 | 3050 | _____ |

In the Answer column, write the keystrokes you need to change the First Display to the Final Display. (Hint: Each change requires multiplication or division.)

| | First Display | Final Display | Answer |
|---|---|---|---|
| 7 | 6 | 12 | _____ |
| 8 | 56 | 4 | _____ |
| 9 | 25 | 5 | _____ |
| 10 | 9 | 72 | _____ |
| 11 | 100 | 10 | _____ |

Handout 32

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# ▼ Activities

## ▼ Opening: (continued)

5. **Distribute** "Basic Calculations". **Allow** them time to complete the problems. As they do so, **check** to see whether anyone needs help using the calculator; for example, they may need to press "C" between operations. **Check** their answers (for the wrong answers, **look** for patterns that may **explain** what employees are doing incorrectly).

6. When employees have finished "Basic Calculations," **distribute** "The Race". **Tell** the class, "Let's see how many questions you can answer in 5 minutes using your calculator!" **Allow** them 5 minutes; **stop;** then **read** the correct answers. **Ask** employees to correct their papers. **Find** out who has the most correct answers–the winner of the race!

7. **Distribute** "Figure Out the Keys". **Allow** employees to work with a partner if they wish to. **Explain** the objective here; **say,** "Which keys must you press to change the first display into the final display? The answer to the first problem is given on the sheet." **Use** the first problem to emphasize the three steps they must follow to change *600* to *680*:

   a. Press the + key.
   b. Press 80.
   c. Press the = key.

   **Do** the second problem aloud with the class; **lead** them to the answer without revealing it.


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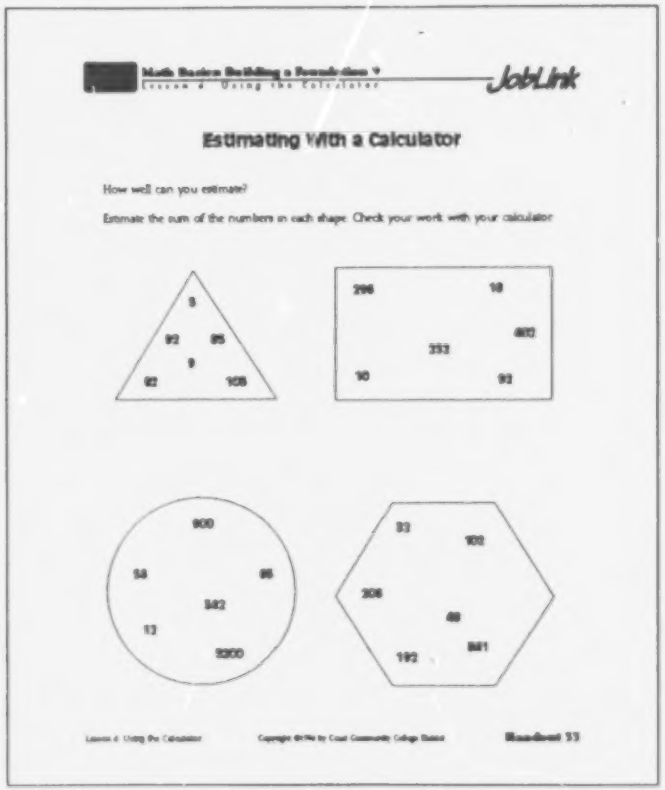
Math Basics: Building a Foundation ▼
Lesson 6: Using the Calculator
JobLink

Estimating With a Calculator

How well can you estimate?

Estimate the sum of the numbers in each shape. Check your work with your calculator.

5
92 85
9
82 108

296 18
402
253
10 92

900
54 85
342
13
5300

33 102
208
48
192 841

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Handout 33


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# ▼ Activities

## ▼ First Activity: 15 Minutes

1. **Relate** today's lesson to the previous less on estimating. **Say,** "In a previous lesson, we learned to estimate. Now let's see how we can use the calculator to make estimating easier and faster. Remember: Estimating is just an educated guess."

2. **Distribute** "Estimating With a Calculator". **Allow** employees time to complete the problems; then **discuss** the results.



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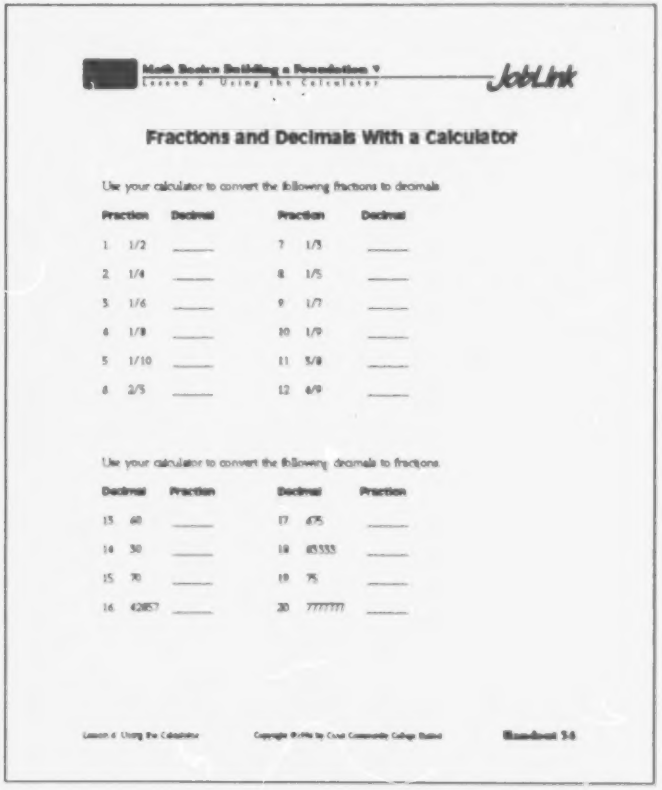

Math Basics: Building a Foundation ▼
Lesson 6: Using the Calculator
JobLink

## Fractions and Decimals With a Calculator

Use your calculator to convert the following fractions to decimals.

| | Fraction | Decimal | | Fraction | Decimal |
|---|---|---|---|---|---|
| 1. | 1/2 | _____ | 7. | 1/5 | _____ |
| 2. | 1/4 | _____ | 8. | 1/5 | _____ |
| 3. | 1/6 | _____ | 9. | 1/7 | _____ |
| 4. | 1/8 | _____ | 10. | 1/9 | _____ |
| 5. | 1/10 | _____ | 11. | 5/8 | _____ |
| 6. | 2/5 | _____ | 12. | 6/9 | _____ |

Use your calculator to convert the following decimals to fractions.

| | Decimal | Fraction | | Decimal | Fraction |
|---|---|---|---|---|---|
| 13. | .60 | _____ | 17. | .675 | _____ |
| 14. | .30 | _____ | 18. | .65333 | _____ |
| 15. | .70 | _____ | 19. | .75 | _____ |
| 16. | .42857 | _____ | 20. | .7777777 | _____ |

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**Handout 34**



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# ▼ Activities

## ▼ Second Activity: 25 Minutes

1. **Review** quickly the basics of fractions and decimals, covered in earlier lessons.

2. **Distribute** "Fractions and Decimals With a Calculator". **Allow** employees time to complete the problems; then **discuss** the results.



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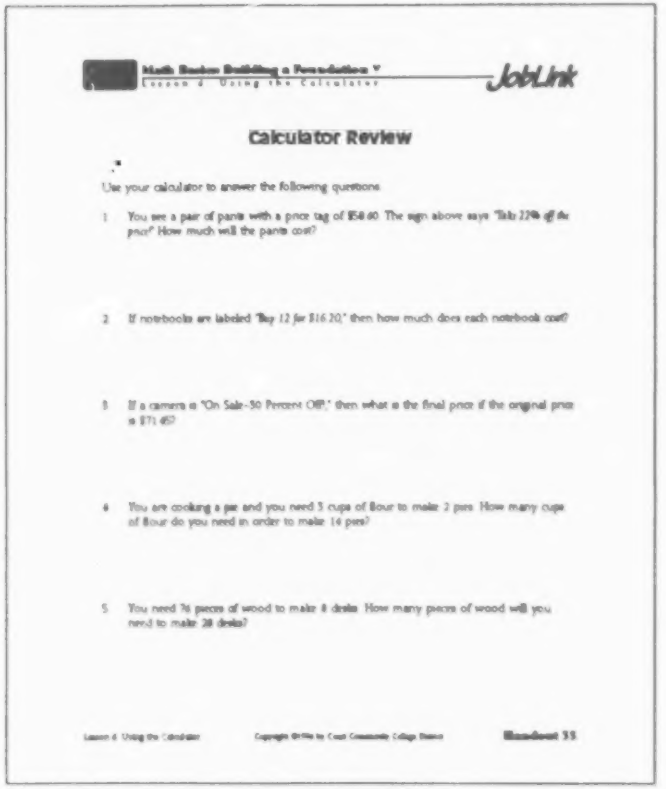

Math Basics: Building a Foundation ▼
Lesson 6: Using the Calculator
JobLink

## Calculator Review

Use your calculator to answer the following questions.

1. You see a pair of pants with a price tag of $58.60. The sign above says "Take 25% off the price!" How much will the pants cost?

2. If notebooks are labeled "Buy 12 for $16.20," then how much does each notebook cost?

3. If a camera is "On Sale--50 Percent Off," then what is the final price if the original price is $71.45?

4. You are cooking a pie and you need 3 cups of flour to make 2 pies. How many cups of flour do you need in order to make 14 pies?

5. You need 76 pieces of wood to make 8 desks. How many pieces of wood will you need to make 20 desks?

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**Handout 35**



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## ▼ Activities

### ▼ Third Activity: 20 Minutes

1. **Review** quickly the core principles underlying rates, ratios, proportions, and percents.

2. **Distribute** "Calculator Review". **Allow** employees time to complete the problems; then **discuss** the results.


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Math Basics: Building a Foundation ▼ JobLink

Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?

Handout 36

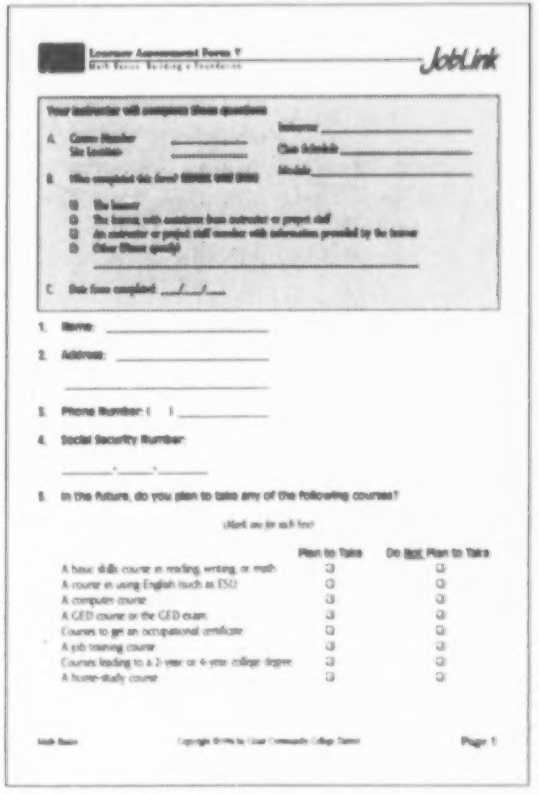
**Handout 36**

Pretest/Posttest ▼ JobLink

Name _____ Date _____

Pretest/Posttest

**Form**



Learner Assessment Form ▼ JobLink

**Form**

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# ▼ Activities

## ▼ Ending: 5 Minutes

1. **Distribute** "Lesson Follow-Up". **Ask** employees to fill out this worksheet.

2. **Distribute** "Posttest" and "Learner Assessment". Have employees complete.

3. **Answer** any questions that they have and **say** goodbye.

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Name _____ Date _____

# Pretest/Posttest

**On the blank line, write the letter of the correct answer.**

____ 1. If you were rounding by 10s, the number 76 would become:
   a. 70
   b. 75
   c. 80

____ 2. Which of the following is a metric measurement:
   a. centimeters
   b. inches
   c. pounds

____ 3. The answer to 1/4 + 2/4 is:
   a. 3/8
   b. 3/4
   c. 1/4

____ 4. When adding decimals, you always line up:
   a. by the number on the left
   b. by the number on the right
   c. by the decimal point

How well do you agree or disagree with the questions below? Using the following scale, **circle** the number that best represents your answer:

| 1 "Strongly agree" | 2 "Agree" | 3 "Disagree" | 4 "Strongly disagree" |
|---|---|---|---|

5. I feel comfortable estimating when I need to get a number quickly.
   1 2 3 4
6. I feel comfortable adding, subtracting, multiplying and dividing decimals.
   1 2 3 4
7. I feel comfortable figuring out percentages.
   1 2 3 4
8. I know how to figure out rates and ratios.
   1 2 3 4
9. I know how to do the math I come across in my daily life.
   1 2 3 4
10. I know how to use both metric and English forms of measurement.
   1 2 3 4
11. I know how to convert fractions to decimals and decimals to fractions.
   1 2 3 4
12. I use a calculator when I need to figure out a math problem.
   1 2 3 4

Instructor _____
Class Schedule _____
Module _____

**Your instructor will complete these questions**

A. Course Number _____
Site Location _____

B. Who completed this form?
**(MARK ONE BOX)**

- ❑ The learner
- ❑ The learner, with assistance from instructor or project staff
- ❑ An instructor or project staff member with information provided by the learner
- ❑ Other (Please specify)

_____
_____

C. Date form completed: ___/___/___

1. **Name:** _____

2. **Address:** _____

_____

3. **Phone Number:** (  ) _____

4. **Social Security Number:**

_____-_____-_____

5. **Age:** _____

6. **Were you born in the United States?**
❑ Yes ❑ No

7. **Sex:** ❑ Male ❑ Female

8. **Race: (Mark One Box)**
- ❑ White
- ❑ Black (African American)
- ❑ Asian or Pacific Islander
- ❑ American Indian or Alaskan Native
- ❑ Hispanic
- ❑ Other (Please specify):

_____

9. **Is English the language that is spoken most often in your home?**
❑ Yes ❑ No

10. **How many years of school have you completed?** _____

**Of these, how many in the U.S.?** _____
**in any other country?** _____

11. **Are you a union member?**
- ❑ Yes– What is the name of your union?

_____

- ❑ No

12. **Please rate your ability to perform each of the following activities.**

*(Please mark one response for every activity)*

| | Poor | Fair | Good | Excellent |
|---|---|---|---|---|
| Read English | ❑ | ❑ | ❑ | ❑ |
| Understand English | ❑ | ❑ | ❑ | ❑ |
| Speak English | ❑ | ❑ | ❑ | ❑ |
| Write in English | ❑ | ❑ | ❑ | ❑ |
| Work as part of a team | ❑ | ❑ | ❑ | ❑ |
| Use math | ❑ | ❑ | ❑ | ❑ |
| Solve problems/use reasoning | ❑ | ❑ | ❑ | ❑ |

13. **Do you have a job?**
- ❑ Yes, employed
- ❑ Yes, on temporary layoff

- ❑ No, retired
- ❑ No, not employed

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**Thank you. You have completed this form. Please return it to your instructor.**


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**Please answer questions 14-18 for the job that allows you to take this course.**

**14. Name of company or employer:**

_____

**15. Job Title:**

_____

**16. On average, how many hours per week do you work on this job?**

_____- _____ Hours per week

**17. How much do you earn at this job?**
*(Write amount and mark one box)*

$_____ ❑ Per hour ❑ Per year

**18. Do you get any of the following benefits at this job?**

*(Mark one for each line)*

| | Yes | No |
|---|---|---|
| Paid vacation | ❑ | ❑ |
| Paid sick leave | ❑ | ❑ |
| Paid holidays | ❑ | ❑ |
| Health insurance | ❑ | ❑ |

**19. How long have you worked at this job?**

_____ - _____ and _____-_____
years months

**20. At your job, do you need to do any of the following?**

*(Mark one for each line)*

| | Yes | No |
|---|---|---|
| Read instructions | ❑ | ❑ |
| Receive spoken instructions in English | ❑ | ❑ |
| Speak English | ❑ | ❑ |
| Work as part of a team | ❑ | ❑ |
| Write in English | ❑ | ❑ |
| Use math | ❑ | ❑ |
| Solve problems/use reasoning | ❑ | ❑ |

**21. Do you work at more than one job?**

❑ Yes ❑ No

**Thank you. You have completed this form. Please return it to your instructor.**


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**Your instructor will complete these questions**

A. Course Number _____ Instructor _____
Site Location _____ Class Schedule _____
Module _____

B. Who completed this form? **(MARK ONE BOX)**

- ❑ The learner
- ❑ The learner, with assistance from instructor or project staff
- ❑ An instructor or project staff member with information provided by the learner
- ❑ Other (Please specify)

_____

C. Date form completed: ____/____/____

**1. Name:** _____

**2. Address:** _____

_____

**3. Phone Number:** (  ) _____

**4. Social Security Number:**

_____-_____-_____

**5. In the future, do you plan to take any of the following courses?**

*(Mark one for each line)*

| | Plan to Take | Do Not Plan to Take |
|---|---|---|
| A basic skills course in reading, writing, or math | ❑ | ❑ |
| A course in using English (such as ESL) | ❑ | ❑ |
| A computer course | ❑ | ❑ |
| A GED course or the GED exam | ❑ | ❑ |
| Courses to get an occupational certificate | ❑ | ❑ |
| A job training course | ❑ | ❑ |
| Courses leading to a 2-year or 4-year college degree | ❑ | ❑ |
| A home-study course | ❑ | ❑ |


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**6. Since this course began, have you:**

*(Mark one for each line)*

| | YES | NO |
|---|---|---|
| Learned what you wanted to learn in this course? | ❑ | ❑ |
| Changed your educational or career goals? | ❑ | ❑ |
| Had more responsibility added to your job? | ❑ | ❑ |
| Moved to a shift you prefer? | ❑ | ❑ |
| Switched from part-time to full-time? | ❑ | ❑ |
| Received a pay raise? | ❑ | ❑ |
| Been promoted? | ❑ | ❑ |
| Received an award, bonus, or other special recognition on your job? | ❑ | ❑ |
| Received your GED? | ❑ | ❑ |
| Applied for a new job? | ❑ | ❑ |
| Started a new job at another company? | ❑ | ❑ |
| Been laid off? | ❑ | ❑ |
| Left your job for any other reason? (Please Specify) _____ | ❑ | ❑ |

**7. Please rate your ability to perform each of the following activities.**

*(Please mark one response for every activity)*

| | Poor | Fair | Good | Excellent |
|---|---|---|---|---|
| Read English | ❑ | ❑ | ❑ | ❑ |
| Understand English | ❑ | ❑ | ❑ | ❑ |
| Speak English | ❑ | ❑ | ❑ | ❑ |
| Write in English | ❑ | ❑ | ❑ | ❑ |
| Work as part of a team | ❑ | ❑ | ❑ | ❑ |
| Use math | ❑ | ❑ | ❑ | ❑ |
| Solve problems/use reasoning | ❑ | ❑ | ❑ | ❑ |

**Thank you. You have completed this form.
Please return it to your instructor.**




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# Getting to Know You

In this exercise you'll get to know your classmates better!

Use the questions below to interview a partner. Then your partner will interview you! At the end of class, you will use the answers on this filled-out worksheet to introduce your partner to the class. Then your partner will introduce you!

First name _____ Last name _____

Nickname ("friends call me...") _____

Three coworkers names _____

_____ _____

Mother's name _____

Father's name _____

Husband's or wife's name _____

Children's names

_____ _____

_____ _____

Favorite foods _____

Favorite singer _____

How did you hear of this company? _____

_____

How long have you worked at this company? _____

Name of supervisor _____


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# A Look at Today's Lesson

Estimating and Rounding Numbers

Fractions

Decimals

Measuring in English and in Metric Units

Rates, Ratios, Proportions, and Percents

The Basic Calculator


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# Estimating Practice

1. You are planning a trip to Seattle, which is 500 miles away. If you average 95 miles an hour, about how long will it take you to get there?

2. You take your car to Pep Boys for four new tires. Each tire costs $38.99. About how much will it cost you for all four tires?

3. You need to build a fence 20 feet wide. If each board is 1.92 feet wide, about how many boards will you need?


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# Basic Rounding Practice

**Round off each Original Number to the nearest *Ten* and then to the nearest *Hundred*.**

| | ORIGINAL NUMBER | Rounded to the Nearest Ten | Hundred |
|---|---|---|---|
| 1. | 12 | _____ | _____ |
| 2. | 58 | _____ | _____ |
| 3. | 235 | _____ | _____ |
| 4. | 6 | _____ | _____ |
| 5. | 89 | _____ | _____ |
| 6. | 174 | _____ | _____ |
| 7. | 101 | _____ | _____ |
| 8. | 863 | _____ | _____ |
| 9. | 20 | _____ | _____ |
| 10. | 3657 | _____ | _____ |



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# Benefits of Rounding

John goes to the store. He wants to buy 8 packages of nails for $1.97 each. He has $17. Does he have enough money to buy the nails?




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# More Estimating Practice

1. Maria wants to buy 25 computer disks for $1.79 each. She has $50.00. Does she have enough money to buy the disks?

2. Your boss has asked you to produce 20 units. Each unit takes 19 minutes, and your shift is 5 hours long. Can you complete the job?




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# Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?




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# Basic Measuring Practice

1. Measure a pencil. *How long* is it?

2. Measure a book or a box in the room. *How heavy* is the book or the box?

3. Measure the length of the classroom. *How long* is it?

4. Measure the cardboard box. *How large* is it? (Note: You must have three numbers here.)




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# Conversion Chart

## Length Conversions

1 foot (ft) = 12 inches (in)
1 yard (yd) = 3 feet (ft)
1 inch (in) = 2.54 centimeters (cm)
1 kilometer (km) = 1000 meters (m)
1 meter (m) = 100 centimeters (cm)
1 meter (m) = 1000 millimeters (mm)

## Weight Conversions

1 kilogram (kg) = 1000 grams (g)
1 kilogram (kg) = 2.2 pounds (lb)

## Liquid Conversions

1 kiloliter (kl) = 1000 liters (l)
1 liter (l) = 1000 milliliters (ml)


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# Conversion Problems

| | CONVERT | TO | ANSWER |
|---|---|---|---|
| 1. | 10 cm | mm | _____mm |
| 2. | 15 ml | kl | _____kl |
| 3. | 88 in | cm | _____cm |
| 4. | 6 ft. | yd | _____yd |
| 5. | 12 cm | in | _____in |
| 6. | 43 ft | in | _____in |
| 7. | 76 km | cm | _____cm |
| 8. | 19 lb | kg | _____kg |
| 9. | 25 kg | lb | _____lb |
| 10. | 34 g | kg | _____kg |


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# Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?



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# Introduction: Fraction Questions

1. What fraction of the people in the class are wearing blue jeans?

2. What fraction of the people in the class are wearing eyeglasses?

3. What fraction of the people in the class are wearing long sleeves?

4. What fraction of the people in the class are women?

**Your Turn!** In the space below, write two of your own Fraction Questions.


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# Shaded Shapes

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# Fraction Bingo Board

1/2 1/4 1/3 2/6 3/8 7/8 5/6 4/7 2/5 3/4 4/5 2/3

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# Adding and Subtracting Fractions With Like Denominators

1. 1/4 + 1/4
2. 1/5 + 2/5
3. 3/8 + 4/8
4. 2/6 + 5/6
5. 1/3 + 5/3
6. 2/4 – 1/4
7. 7/5 – 3/5
8. 6/8 – 3/8
9. 5/6 – 1/6
10. 3/3 – 2/3


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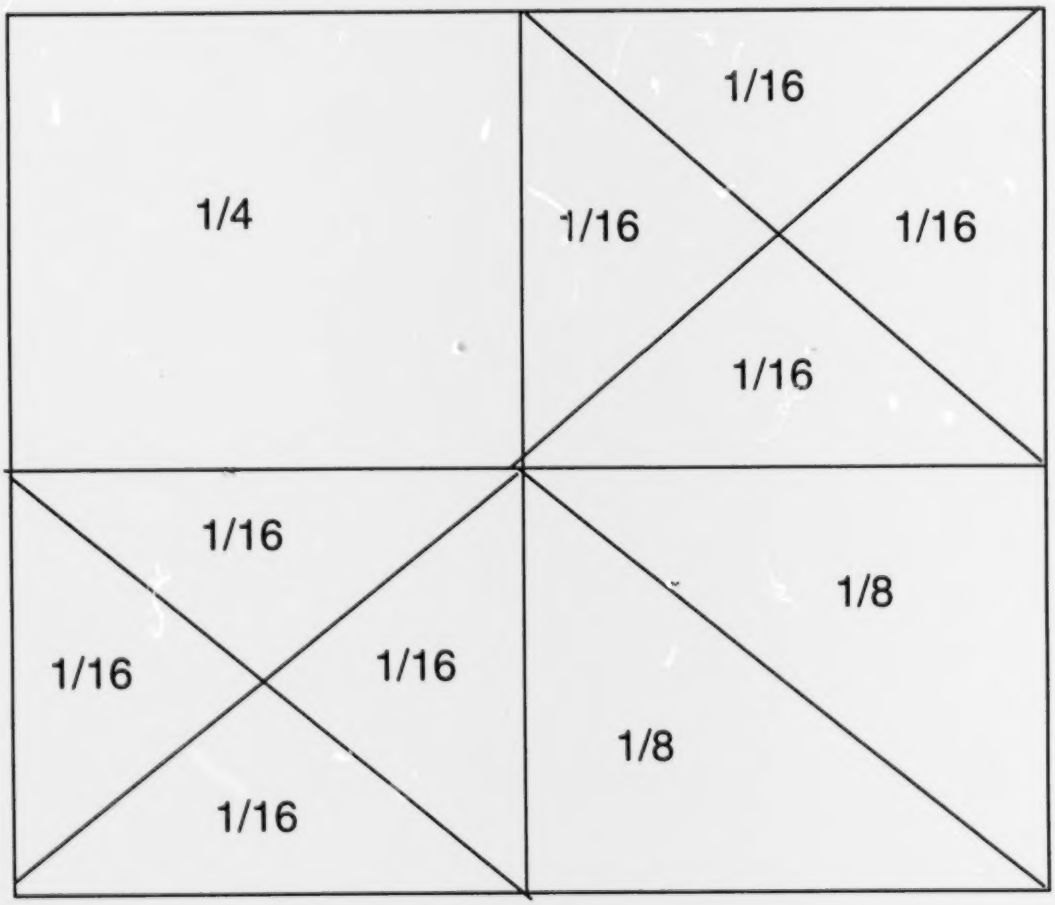
# Fractions Comparison







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# Adding and Subtracting Fractions With Unlike Denominators

1. 1/4 + 1/8
2. 1/3 + 2/6
3. 3/2 + 4/8
4. 2/3 + 5/6
5. 1/5 + 2/10
6. 2/4 –1/8
7. 7/6 – 3/3
8. 6/8 – 3/4
9. 5/4 – 1/2
10. 3/3 – 2/6




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# Multiplying and Dividing Fractions

1. 1/4 x 1/8
2. 1/3 x 2/6
3. 3/2 x 4/8
4. 2/3 x 5/6
5. 1/5 x 2/10
6. 2/4 ÷ 1/8
7. 7/6 ÷ 2/3
8. 6/8 ÷ 3/4
9. 5/4 ÷ 1/2
10. 1/5 ÷ 2/6


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# Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?




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# Decimal Practice: Writing Decimal Forms

In the space provided, write in decimal form the total of the coins in Column 1. Follow the example.

| | Coins | Written in Decimal Form |
|---|---|---|
| ex. | 3 dimes and 4 cents | $0.34 |
| 1. | 4 dimes and 7 cents | $_____ |
| 2. | 8 cents | $_____ |
| 3. | 7 dimes and 5 cents | $_____ |
| 4. | 0 dimes and 7 cents | $_____ |
| 5. | 3 dimes and 6 cents | $_____ |
| 6. | 8 dimes and 0 cents | $_____ |
| 7. | 63 cents | $_____ |
| 8. | 5 dimes | $_____ |
| 9. | 9 cents | $_____ |
| 10. | 60 cents | $_____ |


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# Decimal Practice: Adding and Subtracting

1. 2.23 + 6.19 = _____

2. 7.3 + 4.0027 = _____

3. 291.345 + 2.96 = _____

4. 8.45 + 3.6789 = _____

5. 1765.01 + 234.865 = _____

6. 6.19 - 2.23 = _____

7. 7.3 - 4.0027 = _____

8. 291.345 - 2.96 = _____

9. 8.45 - 3.6789 = _____

10. 1765.01 - 234.865 = _____




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# Decimal Practice: Multiplying and Dividing

1. 2.2 x 6 = _____

2. 7.3 x 4.0 = _____

3. 21.3 x 2 = _____

4. 8.45 x 3 = _____

5. 1.2 x 1.3 = _____

6. 6.12 ÷ 3 = _____

7. 7.5 ÷ 5 = _____

8. 2.4 ÷ 4 = _____

9. 8.50 ÷ 10 = _____

10. 1.60 ÷ 2 = _____


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# Word Problems

1. You go into a store to buy 5 loaves of bread. Each loaf costs $1.28. How much will you pay for your order?

   $ _____

2. You bought 5 gallons of milk and paid $10.60. How much did you pay for each gallon?

   $ _____




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# Menu

## Entrees

| | |
|---|---|
| Special Soup | $2.45 |
| Hamburger | $3.39 |
| Chef's Salad | $2.85 |
| Chicken Sandwich | $4.50 |

## Drinks

Coke, Sprite, Lemonade, Iced Tea, Milk $1.15


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# Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?




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# Proportion Problems

1. Assume that you are a mechanic. You know it takes 4 quarts of oil to fill one truck. How many quarts of oil will you need to fill 6 trucks?

   ___ quarts

2. You are cooking a casserole and you need 6 bags of pasta to make 10 servings of casserole. How many bags of pasta do you need to make 60 servings?

   ___ bags

3. You're making a desk. Suppose you need 50 nails to make 4 drawers for the desk. How many nails do you need to make 10 drawers?

   ___ nails



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# Trip Chart

| Destination | Distance | Travel Time | Gas Needed | Gas Cost |
|---|---|---|---|---|
| Las Vegas | 400 miles | 5.0 hours | 10 gallons | $14.00 |
| Seattle | 450 miles | 9.0 hours | 15 gallons | $16.50 |
| San Diego | 90 miles | 1.5 hours | 3 gallons | $3.75 |
| San Francisco | 300 miles | 6.0 hours | 12 gallons | $16.44 |

1. Where are you going? Choose your destination: _____.

2. What is the distance? _____ miles

3. Assume that your car has a 20-gallon tank and that it takes 10 minutes to fill the tank with gas. How long will it take to put in the tank *only as many gallons as you need for your trip*? _____ minutes

4. How long will your trip take? Be sure to include the time it takes you to put it gas (see #3 above). _____ hours


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# Percent Practice

1. You see a pair of pants with a price tag of $22.00. A sign above the rack says *"Take 15% off the marked price!"* How much will the pants cost you?

   $ _____

2. A store sign offers shoes on sale: *"5 pairs for $40.00!"* How much does *each pair* of shoes cost?

   $ _____

3. A sign over a dress rack says "Sale! Take 20% off ticket price!" What is the final cost of a dress that has a price tag of $55.00?

   $ _____


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# Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?



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# Basic Calculations

Use your calculator to answer the problems below.

1. 4 + 6 = _____

2. 14 - 8 = _____

3. 9 x 12= _____

4. 6.78 ÷ 2.4= _____

5. 2654 + 7831= _____

6. 25 ÷ 5 = _____

7. 6.1 x 2.89 = _____

8. 7.12 + 5.78 = _____

9. 12.67 - 3.85 = _____

10. 45 x 2.54 = _____




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# The Race

**SUGGESTION:** Please reformat to provide a short answer line for each problem. And please list items in sequence **DOWN** the column, not across!

1. 17 + 5 _____
2. 392 + 149 _____
3. 27.18 + 4.86 _____
4. 876.25 + 62.74 _____
5. 17 - 5 _____
6. 392 - 149 _____
7. 27.18 - 4.86 _____
8. 876.25 - 62.74 _____
9. 17 x 5 _____
10. 392 x 149 _____
11. 27.18 x 4.86 _____
12. 876.25 x 62.74 _____
13. 17 ÷ 5 _____
14. 392 ÷ 149 _____
15. 27.18 ÷ 4.86 _____
16. 876.25 ÷ 62.74 _____
17. 36 + 12 _____
18. 784 + 365 _____
19. 45.02 + 8.11 _____
20. 922.03 + 68.10 _____
21. 36 - 12 _____
22. 784 - 365 _____
23. 45.02 - 8.11 _____
24. 922.03 - 68.10 _____
25. 36 x 12 _____
26. 784 x 365 _____
27. 45.02 x 8.11 _____
28. 922.03 x 68.10 _____
29. 36 ÷ 12 _____
30. 784 ÷ 365 _____
31. 45.02 ÷ 8.11 _____
32. 922.03 ÷ 68.10 _____
33. 99 + 38 _____
34. 248 + 112 _____
35. 23.98 + 14.37 _____
36. 762.85 + 76.99 _____
37. 99 - 38 _____
38. 248 - 112 _____
39. 23.98 - 14.37 _____
40. 762.85 - 76.99 _____
41. 99 x 38 _____
42. 248 x 112 _____
43. 23.98 x 14.37 _____
44. 762.85 x 76.99 _____
45. 99 x 38 _____
46. 248 x 112 _____
47. 23.98 x 14.37 _____
48. 762.85 x 76.99 _____
49. 9121 + 567 _____
50. 248.456 + 112.467 _____


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# Figure Out the Keys

In the Answer column, write the keystrokes you need to change the First Display to the Final Display. **(Hint:** Each change requires addition or subtraction.)

| | First Display | Final Display | Answer |
|---|---|---|---|
| 1. | 600 | 680 | 600 + and 80 and = |
| 2. | 163 | 60 | _____ |
| 3. | 44 | 12 | _____ |
| 4. | 36 | 306 | _____ |
| 5. | 1600 | 1900 | _____ |
| 6. | 3333 | 3030 | _____ |

In the Answer column, write the keystrokes you need to change the First Display to the Final Display. **(Hint:** Each change requires multiplication or division.)

| | First Display | Final Display | Answer |
|---|---|---|---|
| 7. | 4 | 12 | _____ |
| 8. | 36 | 6 | _____ |
| 9. | 25 | 5 | _____ |
| 10. | 9 | 72 | _____ |
| 11. | 100 | 10 | _____ |


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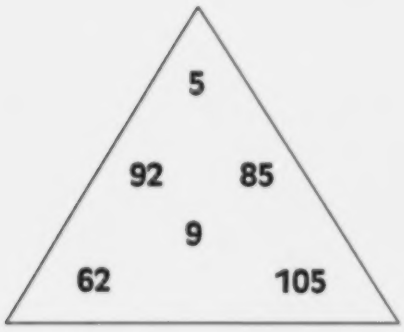
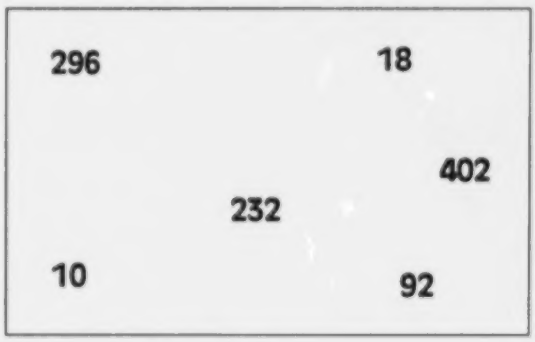
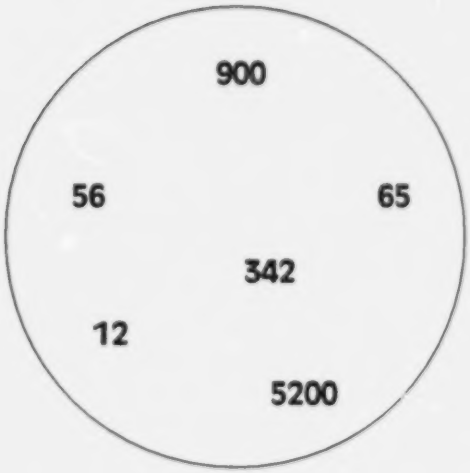
# Estimating With a Calculator

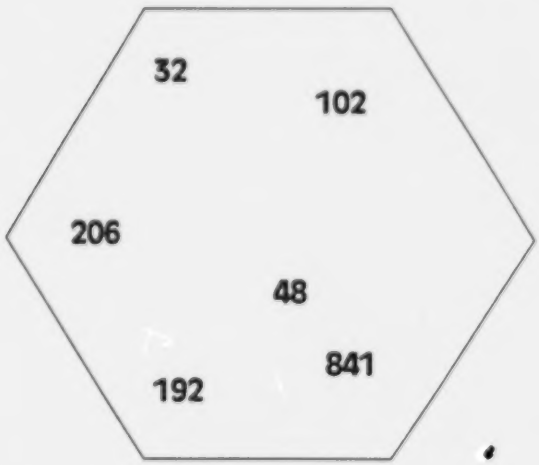
How well can you estimate?

Estimate the sum of the numbers in each shape. Check your work with your calculator.







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# Fractions and Decimals With a Calculator

Use your calculator to convert the following fractions to decimals.

| Fraction | Decimal | Fraction | Decimal |
|---|---|---|---|
| 1. 1/2 | _____ | 7. 1/3 | _____ |
| 2. 1/4 | _____ | 8. 1/5 | _____ |
| 3. 1/6 | _____ | 9. 1/7 | _____ |
| 4. 1/8 | _____ | 10. 1/9 | _____ |
| 5. 1/10 | _____ | 11. 3/8 | _____ |
| 6. 2/5 | _____ | 12. 4/9 | _____ |

Use your calculator to convert the following decimals to fractions.

| Decimal | Fraction | Decimal | Fraction |
|---|---|---|---|
| 13. .60 | _____ | 17. .675 | _____ |
| 14. .30 | _____ | 18. .83333 | _____ |
| 15. .70 | _____ | 19. .75 | _____ |
| 16. .42857 | _____ | 20. .7777777 | _____ |


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# Calculator Review

Use your calculator to answer the following questions.

1. You see a pair of pants with a price tag of $58.60. The sign above says *"Take 22% off the price!"* How much will the pants cost?

2. If notebooks are labeled *"Buy 12 for $16.20,"* then how much does each notebook cost?

3. If a camera is "On Sale–30 Percent Off!," then what is the final price if the original price is $71.45?

4. You are cooking a pie and you need 3 cups of flour to make 2 pies. How many cups of flour do you need in order to make 14 pies?

5. You need 76 pieces of wood to make 8 desks. How many pieces of wood will you need to make 28 desks?



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# Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?


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# Getting to Know You

In this exercise you'll get to know your classmates better!

Use the questions below to interview a partner. Then your partner will interview you! At the end of class, you will use the answers on this filled-out worksheet to introduce your partner to the class. Then your partner will introduce you!

First name _____ Last name _____

Nickname ("friends call me...") _____

Three coworkers names _____

_____ _____

Mother's name _____

Father's name _____

Husband's or wife's name _____

Children's names

_____ _____

_____ _____

Favorite foods _____

Favorite singer _____

How did you hear of this company? _____

_____

How long have you worked at this company? _____

Name of supervisor _____


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# A Look at Today's Lesson

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Measuring in English and in Metric Units

Rates, Ratios, Proportions, and Percents

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2. You take your car to Pep Boys for four new tires. Each tire costs $38.99. About how much will it cost you for all four tires?

3. You need to build a fence 20 feet wide. If each board is 1.92 feet wide, about how many boards will you need?



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| 3. | 235 | _____ | _____ |
| 4. | 6 | _____ | _____ |
| 5. | 89 | _____ | _____ |
| 6. | 174 | _____ | _____ |
| 7. | 101 | _____ | _____ |
| 8. | 863 | _____ | _____ |
| 9. | 20 | _____ | _____ |
| 10. | 3657 | _____ | _____ |


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# Benefits of Rounding

John goes to the store. He wants to buy 8 packages of nails for $1.97 each. He has $17. Does he have enough money to buy the nails?



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# More Estimating Practice

1. Maria wants to buy 25 computer disks for $1.79 each. She has $50.00. Does she have enough money to buy the disks?

2. Your boss has asked you to produce 20 units. Each unit takes 19 minutes, and your shift is 5 hours long. Can you complete the job?



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# Sample Cluster



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# Basic Measuring Practice

1. Measure a pencil. *How long* is it?

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3. Measure the length of the classroom. *How long* is it?

4. Measure the cardboard box. *How large* is it? (Note: You must have three numbers here.)



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# Prefix Chart

milli = one thousandth

centi = one hundredth

deci = one tenth

deka = ten

hecto = one hundred

kilo = one thousand



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# Conversion Chart

## Length Conversions

1 foot (ft) = 12 inches (in)
1 yard (yd) = 3 feet (ft)
1 inch (in) = 2.54 centimeters (cm)
1 kilometer (km) = 1000 meters (m)
1 meter (m) = 100 centimeters (cm)
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## Weight Conversions

1 kilogram (kg) = 1000 grams (g)
1 kilogram (kg) = 2.2 pounds (lb)

## Liquid Conversions

1 kiloliter (kl) = 1000 liters (l)
1 liter (l) = 1000 milliliters (ml)



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# Conversion Problems

| | CONVERT | TO | ANSWER |
|---|---|---|---|
| 1. | 10 cm | mm | _____mm |
| 2. | 15 ml | kl | _____kl |
| 3. | 88 in | cm | _____cm |
| 4. | 6 ft. | yd | _____yd |
| 5. | 12 cm | in | _____in |
| 6. | 43 ft | in | _____in |
| 7. | 76 km | cm | _____cm |
| 8. | 19 lb | kg | _____kg |
| 9. | 25 kg | lb | _____lb |
| 10. | 34 g | kg | _____kg |



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# Introduction: Fraction Questions

1. What fraction of the people in the class are wearing blue jeans?

2. What fraction of the people in the class are wearing eyeglasses?

3. What fraction of the people in the class are wearing long sleeves?

4. What fraction of the people in the class are women?

**Your Turn!** In the space below, write two of your own Fraction Questions.




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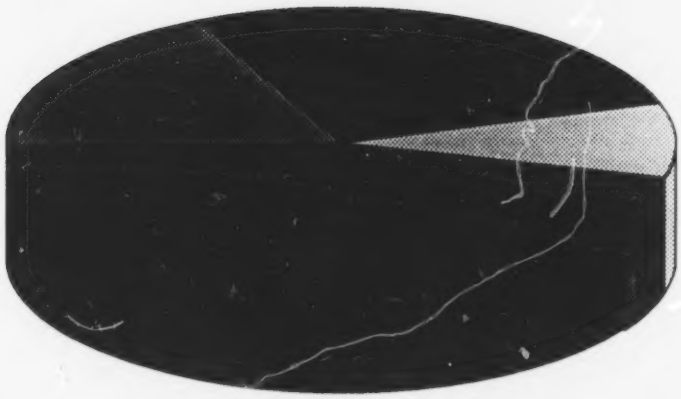
# Shaded Shapes





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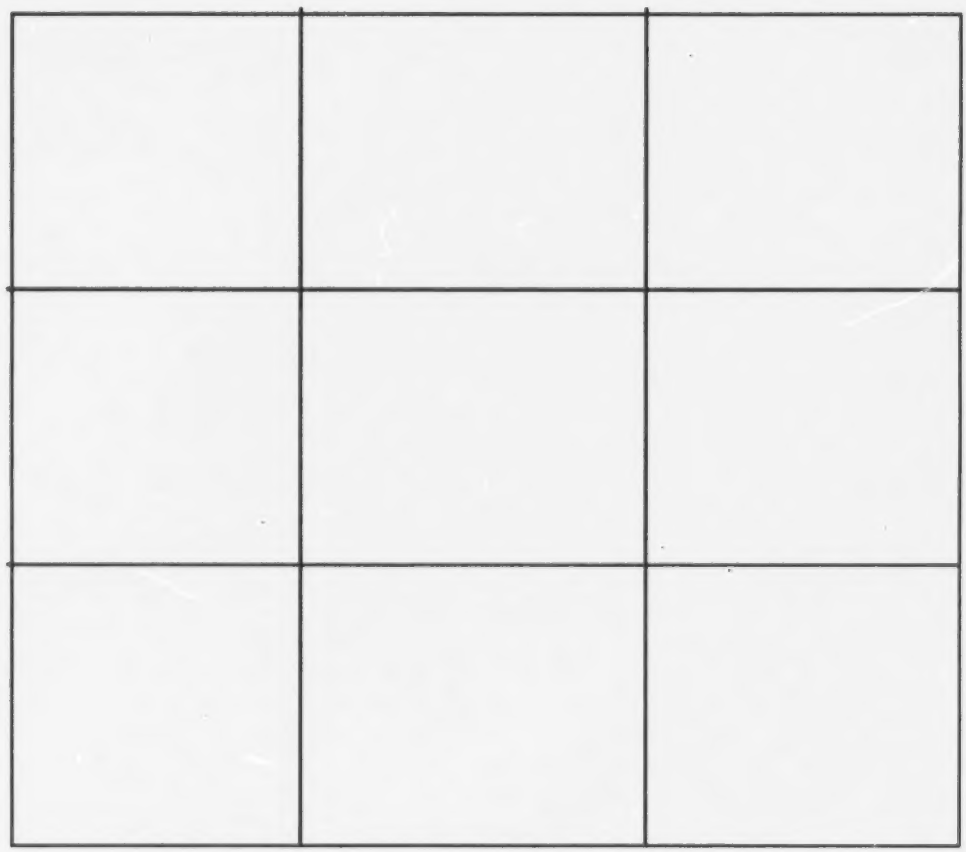
# Fraction Bingo Board

1/2 1/4 1/3 2/6 3/8 7/8 5/6 4/7 2/5 3/4 4/5 2/3



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# Adding and Subtracting Fractions With Like Denominators

1. 1/4 + 1/4
2. 1/5 + 2/5
3. 3/8 + 4/8
4. 2/6 + 5/6
5. 1/3 + 5/3
6. 2/4 - 1/4
7. 7/5 - 3/5
8. 6/8 - 3/8
9. 5/6 - 1/6
10. 3/3 - 2/3




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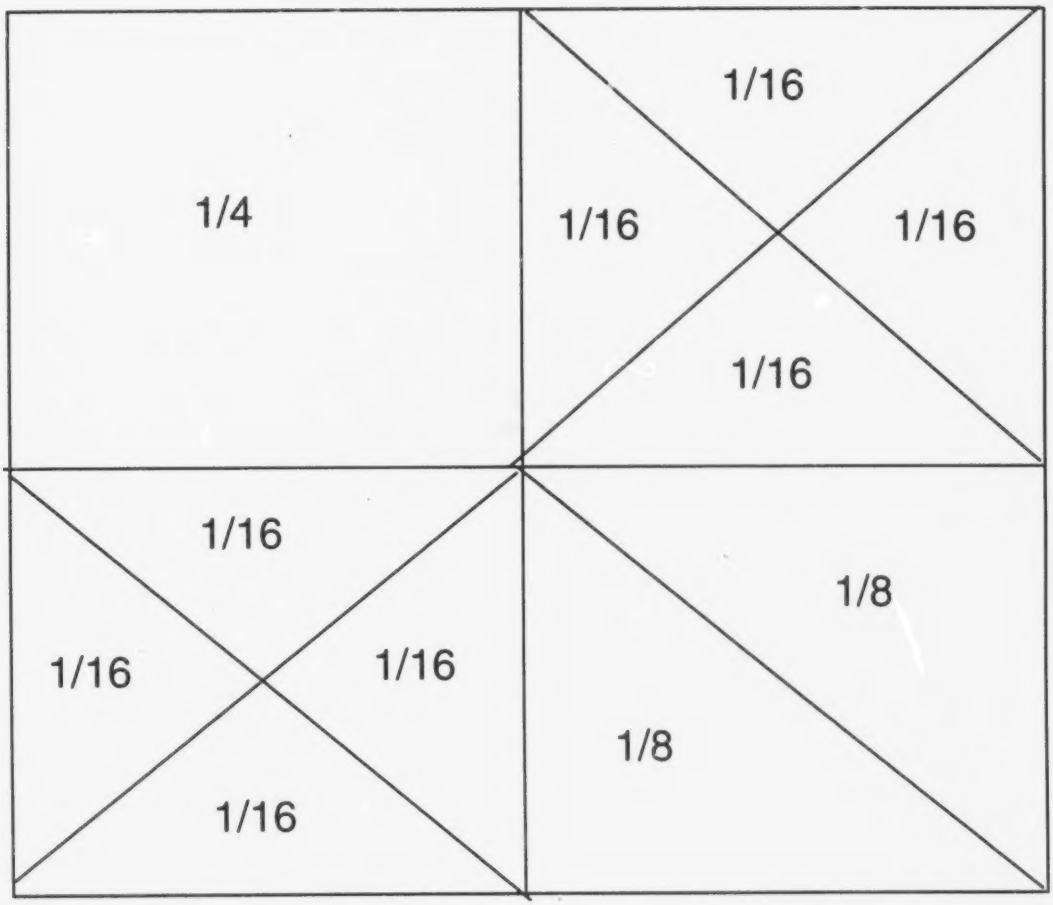
# Fractions Comparison







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# Adding and Subtracting Fractions With Unlike Denominators

1. 1/4 + 1/8
2. 1/3 + 2/6
3. 3/2 + 4/8
4. 2/3 + 5/6
5. 1/5 + 2/10
6. 2/4 -1/8
7. 7/6 - 3/3
8. 6/8 - 3/4
9. 5/4 - 1/2
10. 3/3 - 2/6




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# Multiplying and Dividing Fractions

1. 1/4 x 1/8
2. 1/3 x 2/6
3. 3/2 x 4/8
4. 2/3 x 5/6
5. 1/5 x 2/10
6. 2/4 ÷ 1/8
7. 7/6 ÷ 2/3
8. 6/8 ÷ 3/4
9. 5/4 ÷ 1/2
10. 1/5 ÷ 2/6




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# Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?



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# Shopping Receipt

Poveda Store
18 Broadway
555-1212

| | |
|---|---|
| Candy | $ .75 |
| Bread | $2.17 |
| Cereal | $4.39 |
| Meat | $7.06 |
| Oranges | $1.50 |
| **Total** | $15.87 |


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# Sample Cookie Recipe

To make chocolate chip cookies, you need 1 cup of milk, 2 cups of water, 3 cups of flour, 2 tablespoons sugar, 1 cup of chocolate chips, 1 egg, and 1 bar of butter. This recipe will produce 20 cookies.



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# Solving Proportion Problems Step by Step

**Problem**

"If a recipe that yields 20 cookies requires 1 cup of milk, how much milk is required for 60 cookies?"

**Solution**

*Step 1:* Express the problem in words: "20 cookies is to 60 cookies as 1 cup of milk is to x cups of milk."

*Step 2:* Express the problem in figures:

$$20/60 = 1/?$$

*Step 3:* Cross-multiply the numbers–that is, multiply 60 times 1, which equals 60.

*Step 4:* Divide 60 (the answer to Step 3) by the number that remains, in this case, 20:

$$60/20 = 3 \text{ cups of milk.}$$

**Answer:** 3 cups of milk



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# A Look at Today's Lesson

1. Introduction to the Calculator
   - The "On/C," "CE," and "OFF" Keys
   - The Function Keys
     a. Addition
     b. Subtraction
     c. Multiplication
     d. Division
   - Other Keys

2. Using the Calculator to Review Previously Learned Skills
   a. Estimating
   b. Measuring
   c. Fractions/Decimals
   d. Rates, Ratios, Proportions, and Percents

3. Conclusion



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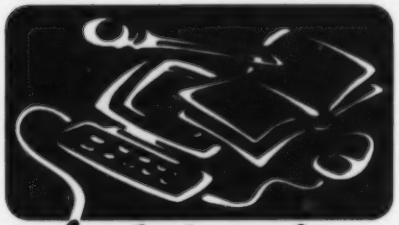

JobLink

Winning At Work

# Math Basics: Building a Foundation

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▼ Supervisor Lesson 2:.....19–31


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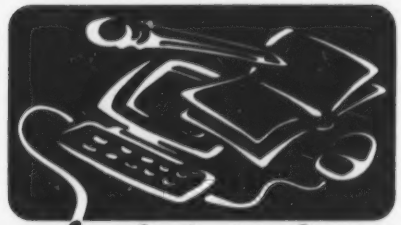

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Winning At Work

# Math Basics: Building a Foundation

**Supervisor Lesson 1**

## ▼ Lesson Description

**Lesson 1:**

Supervisors receive an introduction to the concepts taught Math Basics. Supervisors are then given a summary of the lessons, and both questions to ask and discussion topics to use as the module is being taught.

**Lesson 2:**

Supervisors are given a summary of the progress of the class. The rest of the hour focuses on strategies for improving and continuing the skills learned in Math Basics.


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## ▼ Objectives

By completing this lesson, supervisors will be able to:

1. **Understand** basic concepts taught in module.
2. **Encourage** supervisors to continue learning between classes.

## ▼ Materials Needed

### ▼ Hardware

1. Overhead projector
2. Whiteboard / Flip chart
3. Whiteboard / Flip chart pens
4. Pencils
5. Scratch paper

### ▼ Transparencies

"A Look at Today's Lesson" (Supervisor Transparency 1)

"Lesson Follow Up" (Supervisor Transparency 2)

### ▼ Handouts

"Menu" (Supervisor Handout 1)

"Trip Chart" (Supervisor Handout 2)

## ▼ Classroom Set-up

### ▼ Total Time: 60 minutes

**First Hour**

| | |
|---|---|
| Opening- Large Group | 15 min. |
| First Activity- Large Group | 10 min. |
| Second Activity- Small Groups | 20 min. |
| Third Activity- Large Group | 10 min. |
| Ending- Large Group | 5 min. |

▼ Key — Hardware | Transparencies | Handouts | Large Group | Small Groups | Discussion | Sign-in Sheet


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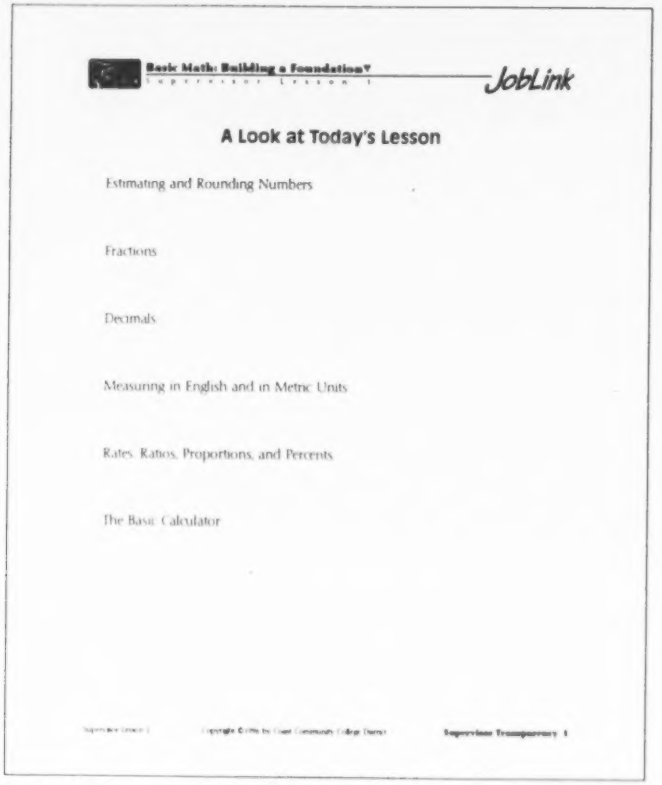


**Supervisor Transparency 1**


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# ▼ Activities

## ▼ Opening: 15 Minutes

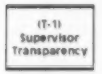
1. **Welcome** everyone and **introduce** yourself.

2. **Ask** everyone for their names and what department or area they are from.

3. **Explain** that the purpose of the next hour is to familiarize them with the material in the class that their employees will be taking over the next few weeks.

4. **Ask** the supervisors, "What do you want your people to get out of the training?" **Write** the information you receive on a flipchart or whiteboard.

5. **Explain** that the module covers a lot of the information they are looking for.




6. **Project** "A Look at Today's Lesson" and **explain** each:

   - Estimating and Rounding Numbers
   - Fractions
   - Decimals
   - Measuring in English and in Metric Units
   - Rates, Ratios, Proportions, and Percents
   - The Basic Calculator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# ▼ Activities

## ▼ First Activity: 10 Minutes

1. **Explain** that everyday we are confronted with examples of math.
2. **Ask,** "Can you give me some work examples of when we use addition? Subtraction? Multiplication? Division?"
3. **Say,** "O.K. those are easy. How about decimals? fractions? percentages? ratios?"
4. **Say,** "Do your employees know how to use a calculator?"
5. **Say,** "We are confronted with opportunities to use math on a daily basis. Many employees have a lot of difficulties figuring out what you or I might find to be simple math."
6. **Explain,** "This class gives an introduction to basic math principles."


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Math Basics: Building a Foundation ▼
Supervisor Lesson 1
JobLink

Menu

Entrees

Special Soup $2.45
Hamburger $3.59
Chef's Salad $2.85
Chicken Sandwich $4.50

Drinks

Coke Sprite Lemonade Iced Tea Milk $1.15

**Supervisor Handout 1**

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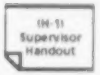
# ▼ Activities

## ▼ Second Activity: 20 Minutes

1. **Explain**, "We are going to do two exercises that are in the module."




2. **Distribute** "Menu".

3. **Ask** supervisors to get into groups of 4.

4. **Instruct** each group to name one Waiter; all others will be Diners. Each Diner must order at least one drink and one entree. The Waiter will calculate the total bill (using any method). In each group, Diner 1 will calculate the total bill. Diner 2 will calculate the total of the drinks (by multiplication, not addition). Diner 3 will calculate the correct change if they give the waiter $20.00. Each person is responsible for checking one another's work.

5. **Allow** the supervisors time to role play.

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Basic Math: Building a Foundation?
Supervisor Lesson 1
JobLink

## Trip Chart

| Destination | Distance | Travel Time | Gas Needed | Gas Cost |
|---|---|---|---|---|
| Las Vegas | 400 miles | 5.0 hours | 10 gallons | $14.00 |
| Seattle | 450 miles | 9.0 hours | 15 gallons | $16.50 |
| San Diego | 90 miles | 1.5 hours | 5 gallons | $5.75 |
| San Francisco | 300 miles | 6.0 hours | 12 gallons | $16.44 |

1. Where are you going? Choose your destination. _____

2. What is the distance? _____ miles

3. Assume that your car has a 20 gallon tank and that it takes 10 minutes to fill the tank with gas. How long will it take to put in the tank only as many gallons as you need for your trip? _____ minutes

4. How long will your trip take? Be sure to include the time it takes you to put it gas (see #3 above). _____ hours

Supervisor Handout 2

**Supervisor Handout 2**

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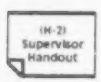
# ▼ Activities

## ▼ Second Activity: (continued)

6. **Bring** the supervisors back together.

7. **Ask,** "What math skills did you use in this exercise?" (Answer: addition, subtraction, multiplication, decimals).




8. **Distribute** "Trip Chart" and **project** it on the overhead projector.

9. **Explain** "This is another exercise the students do in class."

10. **Do** the exercise with the large group.



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# ▼ Activities

## ▼ Third Activity: 10 Minutes

1. **Put** together some handouts from the class that you feel are representative of the worksheets covered. **Emphasize** the handouts that cover information requested by the supervisors.

2. If desired, **go over** the handouts to give the supervisors a chance to "experience" some of the materials their employees will be covering.

(T-2) Supervisor Transparency

3. **Project** "Lesson Follow Up". **Explain** that the students fill out this handout at the end of each class.

3. **Encourage** supervisors to send their employees to class with real math problems to solve.

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## ▼ Activities

### ▼ Ending: 5 Minutes

1. **Ask** for questions concerning the module.
2. **Emphasize** the importance of the supervisor's role in the success of the training.
3. **Remind** supervisors of next session.
4. **Say** good-bye.


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Winning At Work

# Math Basics: Building a Foundation

## Supervisor Lesson 2

## ▼ Lesson Description

Supervisors are given a summary of the progress of class. The rest of the hour focuses on strategies for improving and continuing the skills learned in Math Basics.


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## ▼ Objectives

By completing this lesson, supervisors will be able to:

1. **Review** basic concepts of the Math Basics module.
2. **Reinforce** techniques for increasing the transfer of learning.

## ▼ Materials Needed

### ▼ Hardware

1. Overhead projector
2. Whiteboard/Flip chart
3. Whiteboard/Flip chart pens

### ▼ Transparencies

"A Look at Today's Lesson" (Supervisor Transparency 1)

"Increasing the Payoffs of Training" (Supervisor Transparency 3)

### ▼ Handouts

"Increasing the Payoffs of Training" (Supervisor Handout 3)

## ▼ Classroom Set-up

### ▼ Total Time: 60 minutes

| | |
|---|---|
| Opening- Large Group | 15 min. |
| First Activity- Small Groups | 15 min. |
| Second Activity- Large Group | 20 min. |
| Ending- Large Group | 10 min. |

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▼ Key — Hardware, Transparencies, Handouts, Large Group, Small Groups, Discussion, Sign-in Sheet


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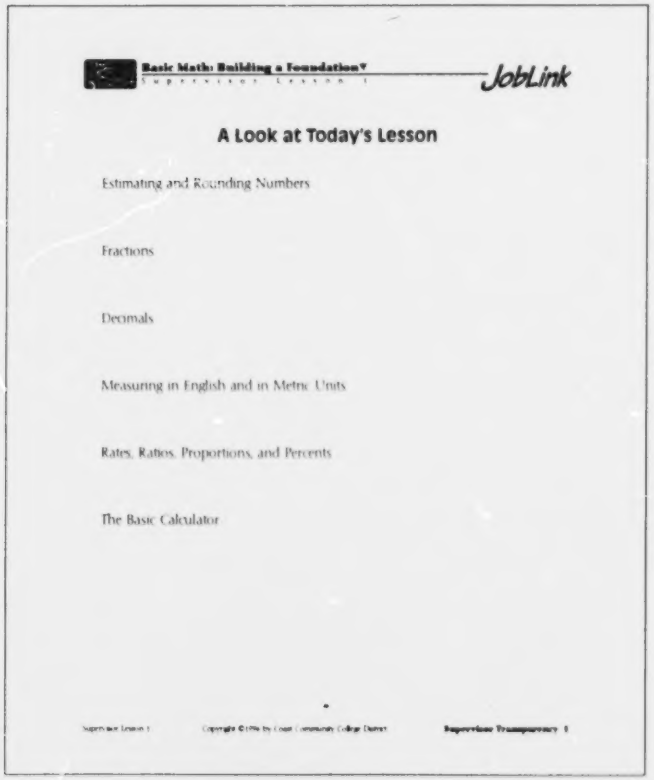


**Supervisor Transparency 1**

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# ▼ Activities

## ▼ Opening: 15 Minutes

1. **Welcome** the group back and **reintroduce** yourself.

2. **Remind** supervisors of the module objectives. **Project** "A Look at Today's Lesson" on the overhead.

(T-1) Supervisor Transparency

3. **Explain** "The purpose of today is to give you some techniques to reinforce the skills your employees have learned over the last few weeks."

4. **Ask** the supervisors to give you feedback on the module - specifically, **ask** for feedback about the module and any improvements they have seen.




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# ▼ Activities

## ▼ First Activity: 15 Minutes

1. **Direct** the supervisors get into groups of 3 - 4.
2. **Have** each group come up with as many benefits to doing this module as they can think of.
3. **Have** each group share their answers.

4. **Discuss** the concept of ROI (Return on Investment). **Explain** that this training program translate to actual savings or improvements for their department as demonstrated by their lists.


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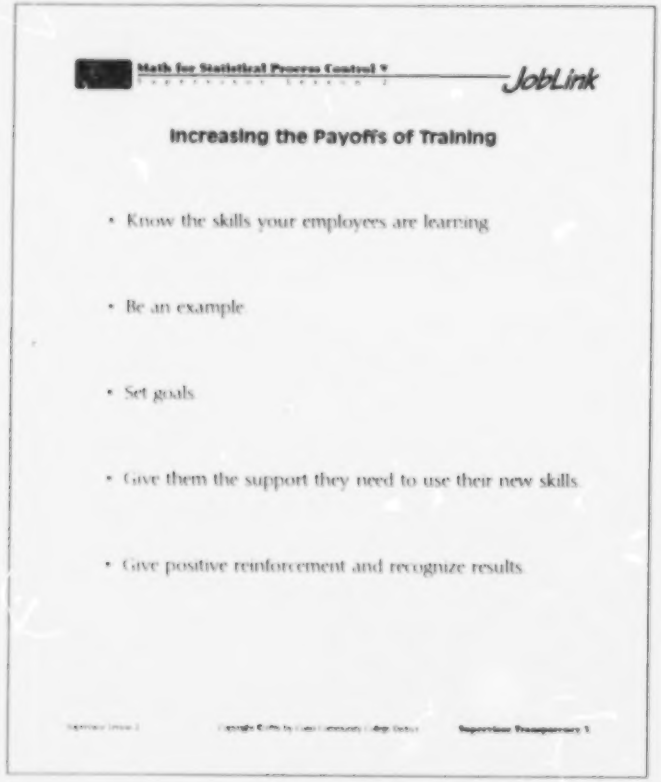
Math for Statistical Process Control ▼
JobLink
Increasing the Payoffs of Training
• Know the skills your employees are learning
• Be an example
• Set goals
• Give them the support they need to use their new skills
• Give positive reinforcement and recognize results

**Supervisor**
**Handout 3, Transparency 3**

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# ▼ Activities

## ▼ Second Activity: 20 Minutes

1. **Distribute** "Increasing the Payoffs of Training".

2. **Discuss** the items on the handout:

- **Know the skills your employees are learning.**
  These supervisor sessions are designed to inform you about what your employees learned in class.

- **Be an example.**
  The employees look up to you as an example. The most common phrase we hear in class is, "But my supervisor doesn't do this, so why should I?"

- **Set goals.**
  Give the employee something to shoot for. Let them know how you expect to see them use the skills.


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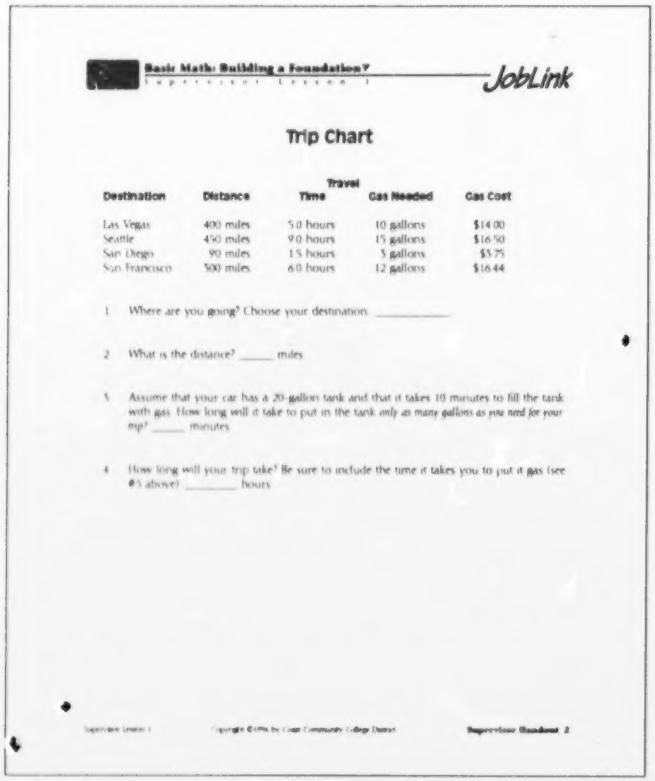

Basic Math: Building a Foundation ▼
Supervisor Lesson 1
JobLink

## Trip Chart

| Destination | Distance | Travel Time | Gas Needed | Gas Cost |
|---|---|---|---|---|
| Las Vegas | 400 miles | 5.0 hours | 10 gallons | $14.00 |
| Seattle | 450 miles | 9.0 hours | 15 gallons | $16.50 |
| San Diego | 90 miles | 1.5 hours | 3 gallons | $3.75 |
| San Francisco | 500 miles | 6.0 hours | 12 gallons | $16.44 |

1. Where are you going? Choose your destination: _____

2. What is the distance? _____ miles

3. Assume that your car has a 20-gallon tank and that it takes 10 minutes to fill the tank with gas. How long will it take to put in the tank *only as many gallons as you need for your trip*? _____ minutes

4. How long will your trip take? Be sure to include the time it takes you to put it gas (see #3 above) _____ hours

Supervisor Lesson 1 Copyright ©1996 by Coast Community College District Supervisor Handout 2

**Supervisor Handout 2**

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## ▼ *Activities*

### ▼ Second Activity: (continued)

- **Give them the support they need to use their new skill.**
  No one likes change. Trying to change our behavior is hard enough without having to fight other factors. Give your employees both a chance and a reason to use their new skills.

- **Give positive reinforcement and recognize results.**
  Most importantly recognize employees when you see them using the new skill. there is nothing more powerful.

3. **Ask,** "Do you have anything to add to the list?"

4. **Ask,** "How can you reinforce the skills learned in Math Basics using the above techniques?"




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## ▼ *Activities*

### ▼ Ending: 10 Minutes

1. **Ask,** "What one thing will you do today to reinforce the skills your employees have learned in this module?"

2. **Give** the supervisors a minute to think of something, and then go around the room and have each person share one thing. **Write** their responses on the flip chart or whiteboard.

3. **Re-emphasize** the importance of each supervisor's support and recognition. **Remind** them that their support and recognition will increase the chances that their employees will use the new skills.

4. **Thank** the supervisors for their time and participation.

5. **Say** good-bye.

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# Menu

## Entrees

| | |
|---|---|
| Special Soup | $2.45 |
| Hamburger | $3.39 |
| Chef's Salad | $2.85 |
| Chicken Sandwich | $4.50 |

## Drinks

Coke, Sprite, Lemonade, Iced Tea, Milk $1.15




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# Trip Chart

| Destination | Distance | Travel Time | Gas Needed | Gas Cost |
|---|---|---|---|---|
| Las Vegas | 400 miles | 5.0 hours | 10 gallons | $14.00 |
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3. Assume that your car has a 20-gallon tank and that it takes 10 minutes to fill the tank with gas. How long will it take to put in the tank *only as many gallons as you need for your trip?* _____ minutes

4. How long will your trip take? Be sure to include the time it takes you to put it gas (see #3 above). _____ Hours




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# Increasing the Payoffs of Training

- Know the skills your employees are learning.
- Be an example.
- Set goals.
- Give them the support they need to use their new skills.
- Give positive reinforcement and recognize results.




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# A Look at Today's Lesson

Estimating and Rounding Numbers

Fractions

Decimals

Measuring in English and in Metric Units

Rates, Ratios, Proportions, and Percents

The Basic Calculator



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# Lesson Follow-Up

1. What things did you learn today?

2. What questions do you still have?

3. How can you apply what you learned to your current job?




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# Increasing the Payoffs of Training

- Know the skills your employees are learning.
- Be an example.
- Set goals.
- Give them the support they need to use their new skills.
- Give positive reinforcement and recognize results.

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